Vol. 121, No. 2 **PAPER TRADE JOURNAL** July 12, 1945
Trade Reg. U. S. Pat. Off.

Crown Zellerbach Will Spend $15,000,000

Western Corporation Announces Fifteen Million Dollar Expansion Program For Pacific Northwest Pulp and Paper Mills — Coated Magazine Paper Will Be Produced At West Linn, Oregon.

SAN FRANCISCO, July 11, 1945—Fifteen million dollars will be spent by Crown Zellerbach Corporation in its pulp and paper plants on an extensive plan to improve its plants and processes during the next several years as wartime restrictions are slackened sufficiently to release necessary materials according to the 1945 annual report just released. Major portion of this amount will be spent in the Pacific Northwest, where the corporation operates five pulp and paper mills and extensive forest properties, and will be in addition to normal expenditures for betterment of plant facilities and upgrading of products.

Long-term contracts have been signed with Time Incorporated and another large eastern publishing firm for furnishing from 45,000 to 60,000 tons of coated magazine paper annually. This will require important changes to the papermill at West Linn, Ore., where the coated paper will be produced. This new departure from traditional Crown Zellerbach manufacture will see coating clay used in liberal quantities, which will result in a substantial reduction in pulpwood usage and therefore be an aid in forest conservation. This pioneer Oregon plant began making newsprint for San Francisco newspapers from cottonwood in 1889, and since has utilized hemlock, spruce and white fir. In order to meet the magazine contracts, one existing newsprint machine will be completely rebuilt and another replaced, and necessary auxiliary equipment, buildings and facilities will be added.

The sulphate mill at Camas, Wash., will be increased to nearly double the present capacity and a modern sulphate bleaching plant installed, marking the first bleached sulphate pulp equipment to be installed in any of the corporation's plants. The bleached pulp produced in this new unit will be used to improve the quality of papers produced at Camas and to supply a new paper machine of the most modern design to permit production of some additional grades of top quality specialty papers. A new paper machine will also be installed at Camas to produce facial tissues. The Camas plant was the first papermill to operate in Washington territory, being built in 1883 to supply newsprint for Portland newspapers.

A construction program is already under way at the Port Townsend, Wash., kraft mill, where a complete new kraft chemical recovery unit was authorized some months ago by the War Production Board. It is in the Townsend mill that the first hydraulic log barker was developed and installed by Crown Zellerbach. A new drum barker will also be installed there so the mill may take delivery of cordwood cut in the farming communities and other woodlots adjacent to Port Townsend.

Post-war plans call for installation of a modern hydraulic log barker in the newsprint mill at Port Angeles, Wash., and resumption of operations of No. 1 newsprint machine, which has been down since September 1942 for lack of logs and manpower. Installation of the hydraulic barkers is also a step forward in forest conservation, as they make possible 10 to 15 per cent fuller wood usage than was possible under previous barking methods.

Corporation officials said today that detailed engineering is about completed on the West Linn project, and that it should not be long before bids can be called on those units for which materials are available. They also said that the corporation program anticipates absorbing all regular employees now in military service and should ultimately result in hiring additional workers.

Gearing its forest growth to the long-range manufacturing program, Crown Zellerbach recently made new acquisitions to its Pacific Northwest timberlands, bringing total ownership now under scientific forest management to about 400,000 acres. It is estimated that these lands will produce new growth annually approximately equal to the pulpwood needs of the five Washington and Oregon plants. When manpower is available, the present forest management program will be amplified by conversion of old logging railroad grades into truck roads. These will provide access for tree plantings, transport of fire fighting equipment, systematic thinnings and a more complete recovery of non-commercial timber of smaller sizes formerly left in the woods.

Subject to ratification by stockholders at their annual meeting on August 9, 1945, the Crown Zellerbach retirement plan will become effective September 1, 1945. The plan provides a retirement program for veteran workers, who, after 65, will receive specific monthly benefits in accordance with their wages and length of service. All retirement benefits based on past service will be financed solely at expense of the company, which will ultimatly contribute more than $4,000,000 into a trust fund for this purpose. Benefits based on future service will be financed jointly by the company and participating employees, the company contributing about two dollars for each dollar placed in the trust fund by employees.

Following is the program outlined for West Linn:

GROUNDWOOD MILL — Installation of six

(Continued on page 24)

Chicago Anxious About Restrictive Prices

High Costs and Expectancy of Lower Volume In Production and Consumption May Soon Create Very Unfavorable Situation—Market Concerned Over Trade Commission Order—Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., July 9, 1945—There is a growing conviction in the Chicago paper market that the record it has built up in a wartime emergency is going to react unfavorably to the paper business in general unless the Office of Price Administration and other agencies see fit to do something about the prices of paper which manufacturers, distributors and others are allowed to charge. Through patriotic reasons, because of government orders and otherwise, production of paper has risen to an immense new high. However, say Chicago members of the industry, little change has been made in covering the costs of such production. Taxes have greatly increased, labor costs have soared and the costs of raw materials which go into the making and converting of paper have been creeping upward to the point where the present situation is extremely dangerous. "Dangerous," said one Chicago paper trade executive, "because the time is soon to come when volume can no longer increase, when production tops will have been reached and when the volume of production and distribution will fall. This can only mean a terriffic 'squeeze' to many branches of the paper trade and genuinely serious financial losses right at the time when paper will be asked to take the leadership in transferring post-war selling programs into dollars-and-cents actualities."

Outside of this trend in thinking, the industry locally shows little disposition to change from its position of tightness in all lines and grades. Waste-paper-wise (perhaps the only spots where additions to available tonnage could come) the Chicago trade reports better than fair collections and a determination to foster more salvage programs during the summer months.

Legislature Approves Huge Expenditure

The Illinois Legislature adjourned sine die on June 30 after a hectic six months session which saw a record number of appropriations approved for stimulation of post-war programs in this State. The paper industry was interested in the defeat of a State Fair Employment Practices Act—known as the "anti-discrimination" bill—which received only forty votes —thirty-seven short of passage requirements—in a final roll call in the House. The Legislature also extended benefit payments under the Unemployment Compensation Insurance Act to twenty-six weeks and fixed the maximum rate of payment at twenty dollars, making Illinois one of the most liberal of all States in this respect. Slight increases were also approved in Workmen's Compensation legislation. The 64th General Assembly also approved several bills pertaining to motor vehicles, among which were one which would permit longer trucks and heavier loads for the benefit of that type of transportation. No changes were made in the sales tax rates and no additional taxes were levied, the State having some $200,000,000 in so-called "surplus" to cover a large part of the appropriations above indicated. Bills pertaining to equal pay for women and to a proposed State Wage-Hour law received scant attention from the legislators. Important tax legislation included one series of bills which places all Illinois on a 100% valuation basis as far as assessments of real property are concerned. Slum clearance and traction legislation were sent through by a combination of power involving Mayor Edward J. Kelly of Chicago and Governor Dwight H. Green.

Concern Shown Over FTC Charges

Considerable interest is being aroused locally over the announcement of the Federal Trade Commission that it had ordered the Book Paper Manufacturers Association and 42 member manufacturers to "cease and desist from continuing or entering into any conspiracy or combination to fix uniform prices for book paper." The order also is directed against the offices and executive committee of the association whose members were said by the Commission to represent approximately eighty per cent of the entire industry.

Within the Commission statement was the following which captured the immediate attention of Chicagoans interested. "Despite the variety of and the many differences in book paper, the commission finds that the respondents have succeeded in maintaining price uniformity to a remarkable degree through use of base prices to which various differentials are applied." The alleged practices, it was said, "deprive private and governmental purchasers of the benefits of price competition."

The FTC announcement added that "according to the findings, the respondents' long record of identical bidding on Government Printing Office proposals and their reaction to nonidentical bids that are low, together with other facts shown, make it evident that they have agreements and understandings concerning prices to the Government Printing Office."

Western Salesmen To Meet July 16

The western division of the Salesmen's Association of the Paper Industry will hold its next open meeting on Monday noon, July 16, at the Hotel Sherman. At that time a film developed by the Hercules Powder Company and reported to be a splendid pictorial demonstration of the future possibilities of cellulose in the post-war period, will be shown. The final golf outing of the year will be held at the Olympia Fields Country Club on August 8, according to Jim Sensenbrenner, golf chairman.

Revokes Chlorine Order

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1945—Brightness limitations of various grades of paper and paperboard, attained by the use of chlorine, have been removed, effective July 4, 1945, by revocation of Order L-11, which was issued April 30, 1943, the Paper Division of the War Production Board announced today.

Importations of "high-white" pulp have eliminated the need for the controls of Order L-11. The Canadian pulp and paper industry made a similar move, effective July 1, WPB said.

Chlorine, used as a bleaching agent in papermaking, will continue to be allocated under Conservation Order M-19, WPB emphasized.

Hundreds of industrial boilers requiring feed pressures up to 450 pounds per sq. in. are fed by Ingersoll-Rand Class GT pumps. Recent improvements in materials and design, such as new casings and oversize oil-lubricated ball bearings made these pumps even better boiler-feeders.

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10-634

Mill Employment Declines Slightly in May

Wisconsin Commission Reports Fractional Employment Drop But Slight Increase In Payrolls—Board To Supervise Alexander Park —Employee Retires After 59 Years of Service—Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 9, 1945—Wisconsin manufacturers of paper and paper products reported 22,700 persons employed during May, according to the Industrial Commission of Wisconsin, Madison, Wis. This represented a decline of 0.3% when compared with April, or about 75 persons.

May payrolls, however, were up 0.2% over April, the figures being $936,000 and $934,000. The average individual worked 49 hours, per week, earning $41.32, or 84.4 cents per hour.

In the Milwaukee metropolitan area, 21 firms manufacturing paper and allied products reported a total of 2,070 persons on their payrolls, a decline of 0.9%. Total earnings were $81,653, down 2.4%. The average person worked 45.7 hours, receiving $39.45 per week, or 86.2 cents per hour.

Employee Retires After 59 Years Service

William H. Owen, Neenah, Wis., who had completed 59 years of active service for the Neenah Paper Company in that city, retired from the firm on July 1. Born in England, he came to the United States as a young man, beginning work for the Neenah Paper Company at the age of 16. The firm was then known as the Patten and Russel Paper and Pulp mill. His first job was to supply wood to the pulp grinders, and he worked 12 hours daily for 75 cents a day.

He held various other jobs in the mill, before it was dismantled seven years after he began work. A finishing room addition was then built and a new paper machine was installed. The addition today holds three paper machines. When this addition was completed, Mr. Owen became head cutter man runner in the new finishing room, a job he held without interruption until his retirement.

During his long service he saw the personnel increase from 40 to 400. He was given official recognition at the annual employes Christmas party December 23, 1939, when he was presented with a gold watch bearing the company inscription and signed by D. K. Brown, president and general manager. Employes of the beater room presented him with a gift before he retired July 1.

Marathon Corp. Holds Picnic

The tenth annual picnic of employes of Marathon Corporation, Rothschild, Wis., was held July 4 at Rothschild park. Games and contests for children and adults, swimming, dartball, horseshoe games and other entertainment were on the program, and lunch and refreshments were saved. The evening was devoted to dancing. Otto Kopplin was general chairman of the picnic and Christie Seavers was co-chairman.

Board to Supervise Alexander Park

A park board has been appointed by C. A. Jasperson, Port Edwards, Wis., village president, to assume supervision of the Edwards-Alexander Memorial Park. Walter Hintz is the board chairman.

Village crews have begun improvement of the new park, which was bequeathed to the village by Mrs. L. M. Alexander, widow of one of the founders of the present Nekoosa-Edwards Paper Company and mother of its present president. Benches and tables have been placed in the park to be used by residents of Port Edwards and Nekoosa for picnics. A baseball diamond has been built, and a croquet court also is now available. A skating rink will be prepared next fall, and one of the heated rooms in the garage will be available to skaters.

Kimberly-Clark Outing Set for August 5

The Kimberly-Clark Activities Association's annual picnic will be held Sunday, August 5, instead of July 29, as originally planned, William Chopin, general chairman, announced last week. The change was made to provide for special entertainment for the children which would not have been available at the earlier date. The event will be held at Riverside park, Neenah, Wis.

Smith Plastic Plant in Operation

[FROM OUR REGULAR CORRESPONDENT]

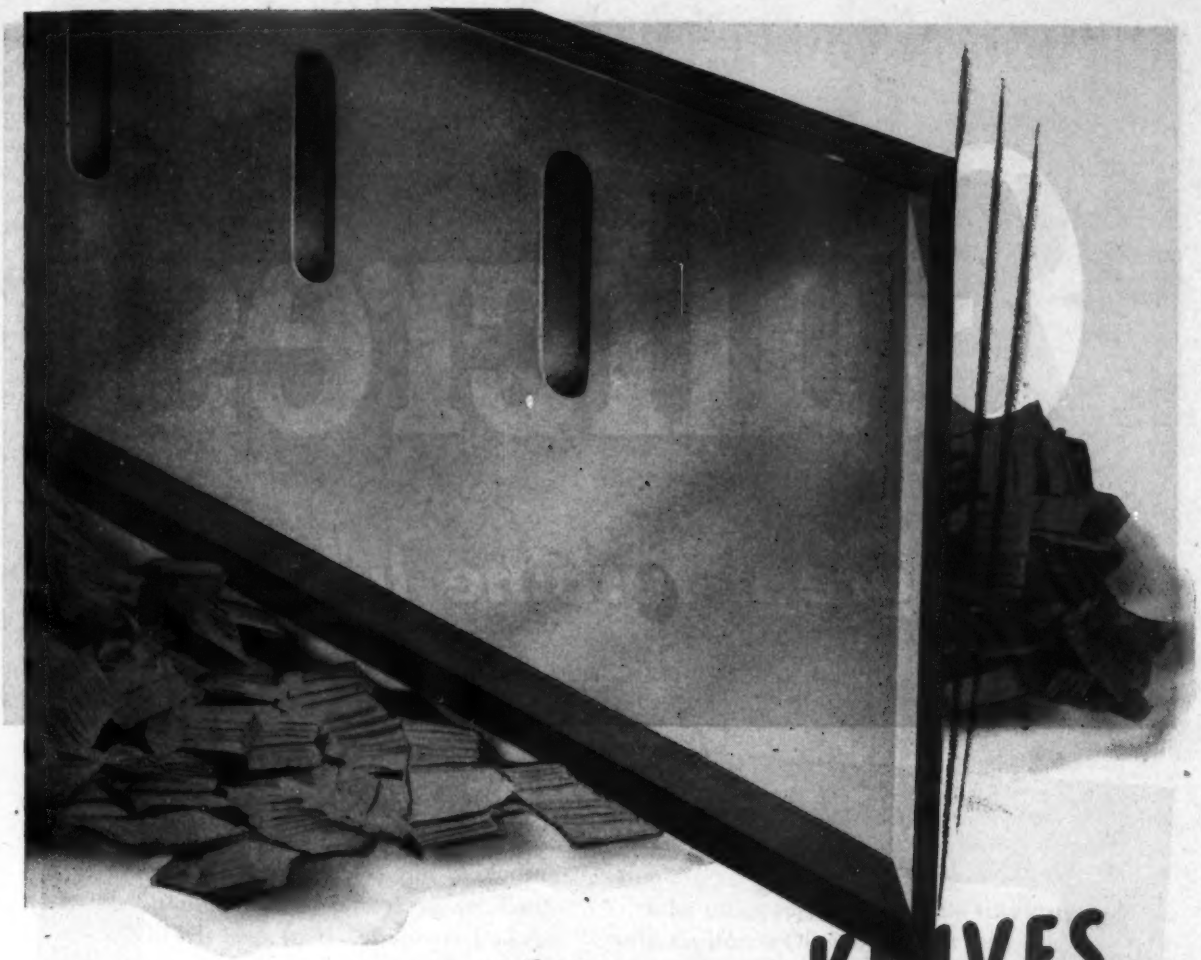
TORONTO, Ont., July 9, 1945—The pilot plant constructed at Cornwall, Ont., by Howard Smith Paper Mills Ltd., for the making of a specially developed plastic, has now been operating on a commercial scale for several months. Production was begun on a small scale and gradually increased, as experience with the new material gradually leveled off into a definite "know how." It is understood that certain skills are yet to be acquired by additional technical workers before the mill can be operated at its full capacity. However, the present prospects are that everything will be running smoothly and at full capacity within a very few months.

The new plastic product is made from lignins derived from waste sulphite liquors from the pulp mills and comes in sheets. The product is already on the market and is being used chiefly in the making of electrical insulating units and table tops.

Despite the continued labor shortage, the Howard Smith Company continues to operate its pulp and white paper mills at close to 24-hour capacity as there is no problem of markets for their regular products but rather a continual struggle to maintain production at the highest possible level. The company has drawn up a program for future plant expansion and development which is being delayed solely by materials and labor shortages. Only minor replacement and plant improvement work is presently being done.

Lowander Resigns from Stein Hall

J. A. (Jack) Lowander, assistant vice-president of Stein, Hall and Company, Inc., and business manager of its Long Island City factory where adhesives for the paper box, envelope and other industries are made, is severing his connection with the company July 31st. Mr. Lowander joined the company in August 1921, and during most of his 24 years' service has been associated with the adhesive part of the business.



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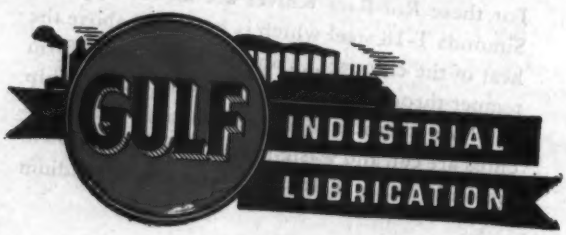

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M & O Plans $6,000,000 in Improvements

President Donald Reveals Outline of Program That Will Expand Company's Output, Improve Its Production and Add Substantially To Size of Its Postwar Working Staff—Furlong appointed Director

MINNEAPOLIS, July 11, 1945—Donald D. Davis, president of Minnesota and Ontario Paper Company, today announced the completion and approval of plans for expenditures to exceed $6,000,000 for the modernization and expansion of the facilities of the company in Minnesota and Ontario, made possible by the finacial readjustments approved by the stockholders at their annual meeting May 28, 1945. Mr. Davis stated the contemplated facilities program for the production of new products and improvement in present products will go forward as rapidly as equipment, material and labor permit. Government approval has been obtained on all of the major projects.

At International Falls the company plans the following: new Insulite manufacturing machine, increasing capacity 40 per cent; new research laboratory; additional equipment for grinding wood and manufacturing paper; new plant for bleaching 100 tons of kraft paper daily; new plant for bleaching 75 tons of groundwood daily; new plant for filtration of the huge quantities of water used in making paper; mechanical equipment to insure maximum utilization of by-products; additional structures for housing Mando employees; additional machines for preparing and grinding pulpwood and manufacturing papers; extensive modernization of miscellaneous equipment and installation of new machinery.

At Canadian mills in Fort Frances and Kenora, plans provide for: new facilities for production of groundwood; new water wheels and other additions to hydro-electric and steam power plants; modernization of paper machines; extensive new miscellaneous plant equipment; new tug and work boats and other marine equipment; modernization of wood grinding equipment and installation of new machinery.

New woods operating facilities and equipment in both Canada and the United States including new headquarters camps and logging camps with improved living facilities, refrigeration, electric lights and two-way radio communications, and major additons to the expansion of mechanized logging equipment.

Mr. Davis further stated that the facilities program of modernization and expansion when accomplished, and at the estimated rate of operations, would require a total of approximately 5,600 company employees at all plants and in the woods, compared with present employment of approximately 4180, which includes 900 prisoners of war now working in the Canadian woods. It is therefore estimated that the modernization and expansion program at all plants and in the woods will provide approximately 2300 new civilian jobs. There are 1251 men and women in the Armed Services of the United States and Canada, the majority of whom are expected to return to the Company.

Mr. Davis further stated that the Directors of the Mando properties in approving this comprehensive modernization and expansion program were very much encouraged by the enactments of the last session of the Minnesota Legislature, which, while not completely sufficient, provided additional help to the State Division of Forestry showing that the legislators had an increasing realization of the importance of Minnesota forest industries. Mr. Davis further stated that it is expected this program can be completed in three years or less. Present rates of production continue to be limited by shortage of woods labor in both Minnesota and Canada, but if is hoped that these conditions will gradually improve.

Mr. Davis expressed appreciation for the cooperation of the government officials in Minnesota and Ontario, and particularly in the cities of International Falls, Fort Frances and Kenora, and stated that he hoped this program of modernization and expansion would increase confidence of these communities in the Mando operations and evidence clearly to the employees of the Companies the future opportunities for and security of employment.

Furlong Directs Public Relations

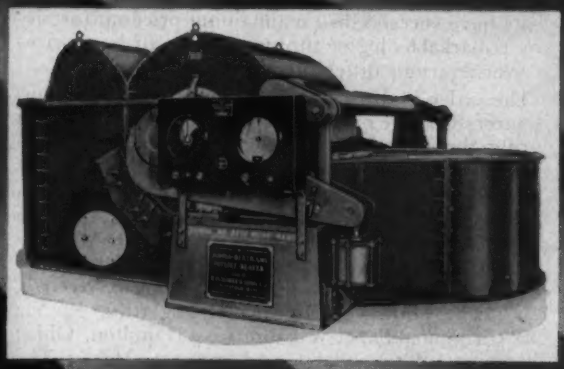
MINNEAPOLIS, July 6, 1945—Donald D. Davis, president of Minnesota and Ontario Paper Company has announced the appointment of L. A. Furlong of Minneapolis as director of public relations for the company. Mr. Furlong has for the past twelve years been director of publisher newsprint sales.

He is likewise known for his activities as chairman of Minnesota Forest Industries Committee, which he assumed in 1943, and also as a member of the executive committee of the Keep Minnesota Green organization set up by Governor Edward J. Thye in May 1944.

L. A. FURLONG

He came to Minneapolis in 1911 and engaged in the pole and tie business and in 1926 joined the National Pole and Treating Company, an affiliated company. He was appointed director of Mando publisher sales in 1933 and as such has been in close contact with newspaper men in various parts of the country.

The JONES-BERTRAM BEATER



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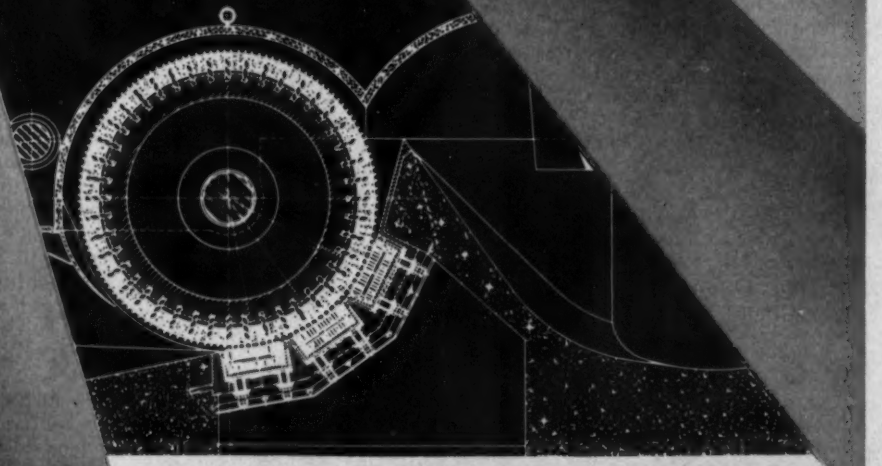

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FTC Acts Against Book Paper Makers

WASHINGTON, D. C., July 9, 1945—Book Paper Manufacturers Association, New York City, and 42 member manufacturers, said to represent approximately 80 percent of the production capacity of the entire industry, have been ordered by the Federal Trade Commission to cease and desist from continuing or entering into any conspiracy or combination to fix uniform prices for book paper and deprive private and governmental purchasers of the benefits of price competition. The order also is directed against the officers and executive committee of the Association. Despite the variety of and the many differences in book papers, the Commission finds that the respondents have succeeded in maintaining price uniformity to a remarkable degree through the use of base prices to which various differentials are applied.

The order is directed against the following manufacturers who are or were members of the Association during the period covered by the complaint in the proceeding:

Allied Paper Mills, Kalamazoo, Mich.; American Writing Paper Corp., Holyoke, Mass.; The Appleton Coated Paper Co., Appleton, Wis.; The D. M. Bare Paper Co., Roaring Spring, Pa.; The Beckett Paper Co., Hamilton, Ohio; Bergstrom Paper Co., Neenah, Wis.; The Martin Cantine Co., Saugerties, N. Y.; The Champion Paper & Fibre Co., Hamilton, Ohio; Champion-International Co., Lawrence, Mass.; The Chillicothe Paper Co., Chillicothe, Ohio; Columbian Paper Co., Buena Vista, Va.; Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.; Dill & Collins, Incorporated, Philadelphia; Everett Pulp & Paper Co., Everett, Wash.; Fitchburg Paper Co., Fitchburg, Mass.; French Paper Co., Niles, Mich.; P. H. Glatfelter Co., Spring Grove, Pa.; W. C. Hamilton & Sons, Miquon, Pa.; Hammermill Paper Co., Erie, Pa.; Inland Empire Paper Co., Millwood, Wash.; International Paper Co., New York; The Jessup & Moore Paper Co., Philadelphia; Kimberly-Clark Corp., Neenah, Wis.; McLaurin-Jones Co., Brookfield, Mass.; The Mead Corp., Chillicothe, Ohio; The Michigan Paper Company of Plainwell, Plainwell, Mich.; Mohawk Paper Mills, Inc., Waterford, N. Y.; Newton Falls Paper Co., Newton Falls, N. Y.; New York and Pennsylvania Company, Inc., New York; The Northwest Paper Co., Cloquet, Minn.; Oxford Miami Paper Co., New York; Oxford Paper Co., New York; The Parker-Young Co., Lincoln, N. H.; Rex Paper Co., Kalamazoo, Mich.; Schmidt Lithograph Co., San Francisco; The Sorg Paper Co., Middletown, Ohio; Standard Paper Manufacturing Co., Richmond, Va.; S. D. Warren Co., Boston; Watab Paper Co., Sartell, Minn.; West Virginia Pulp & Paper Co., Wilmington, Del.; Watervliet Paper Co., Watervliet, Mich.; and Wheelwright Papers, Inc., New York.

Individual respondents named in the order are P. H. Glatfelter, chairman, treasurer and a member of the executive committee of the Association; C. L. Barnum, secretary and assistant treasurer of the Association; and Clarence A. Clough, Dwight R. Curtenius, G. K. Ferguson, Charles A. Gordon, W. H. Kenety, John R. Miller, F. Henry Savage, John S. Sensenbrenner, Roger D. Smith, L. G. Thomson and R. I. Worrell, all members of the Association's executive committee.

Findings of the Commission are that the capacity, tendency and effect of the combination maintained by the respondents, and the practices engaged in thereunder, have been to establish and maintain uniform base prices for book papers; to establish and maintain uniform geographical zones within each of which delivered prices to purchasers, wherever located within any zone, are uniform, and to fix and determine uniform price differentials as between such zones; to establish and maintain uniform quantity brackets and uniform price differentials for book papers as between such quantity brackets; to establish and maintain uniform price relationships between spot and contract purchases; to establish and maintain, and from time to time modify, expand or readjust, through the guise of "Trade Customs," uniform and arbitrary price differentials for each of the many variations in color, weight, size, finish and type of book paper from specified predetermined bases, and thus determine the additions or subtractions to be made from a base price in any particular transaction; to provide and maintain means for the exchange of future and current price information; to prepare and promote the use of a uniform contract of sale with provisions for supporting and furthering the maintenance of price uniformity; and to bring about collective consideration and discussion of base prices for book papers as a means of arriving at understandings and a common course of action with respect to such prices.

In considering the respondents' use of base prices, the Commission finds that through the application of various standard price differentials characterized by them as "Trade Customs," through the use of their zoning system and various standard quantity and grade price differentials, the question of price uniformity, in an industry where thousands of different prices necessarily result from combinations of the various factors mentioned, is reduced to the single element of base price.

Once a base price is set, the findings continue, the application of the factors referred to automatically determines the price to be paid by the purchaser for any of the various sizes, weights, finishes, colors, or quantities in which paper may be ordered, through fixing the sum to be added to or taken from the base price for all such variations.

According to the findings, the respondents' long record of identical bidding on Government Printing Office proposals, and their reaction to nonidentical bids that are low, together with other facts shown, make it evident that they have agreements and understandings concerning prices to G.P.O.

The Commission's order directs the respondents to cease and desist from entering into, continuing or carrying out any planned common course of action, combination or conspiracy to engage in any of the following practices:

(1) Fixing or maintaining uniform prices, discounts, terms or conditions of sale for any kind or grade of book paper, or in any manner fixing or establishing any prices, discounts, terms or conditions of sale.

(2) Exchanging or relaying, directly or through the Book Paper Manufacturers Association, or any other agency, price lists or other information as to current prices, discounts, terms or conditions of sale, for the purpose or with the effect of restraining price competition in the sale of book paper; or exchanging or relaying, directly or through the Association, or any other agency, information as to future prices, discounts, terms or conditions of sale to be quoted for book paper.

(3) Using in the quotation and sale of book paper the differentials in price for variations in color, weight, size, finish, trim, packing, type or quantity of

(Continued on page 46)

BROUGHTON UNIT VACUUM CONTROL

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Dependable control of flat-box vacuums.

Eliminates completely the flat-box vacuum pump.

Allows more water to be worked into the sheet.

In many installations helps decrease two sidedness because of maintained gradated vacuums. Much more uniform water-mark.

All adjustments may be made from the front of the wire.

The air and water are separated, the water falling by gravity into a seal tank. The individual vacuum breakers, a function of the Broughton Vacuum Controller, enters air in controlled amounts, into the boxes only, thereby diminishing enormously the amount of air handled as compared to all other systems now in use.

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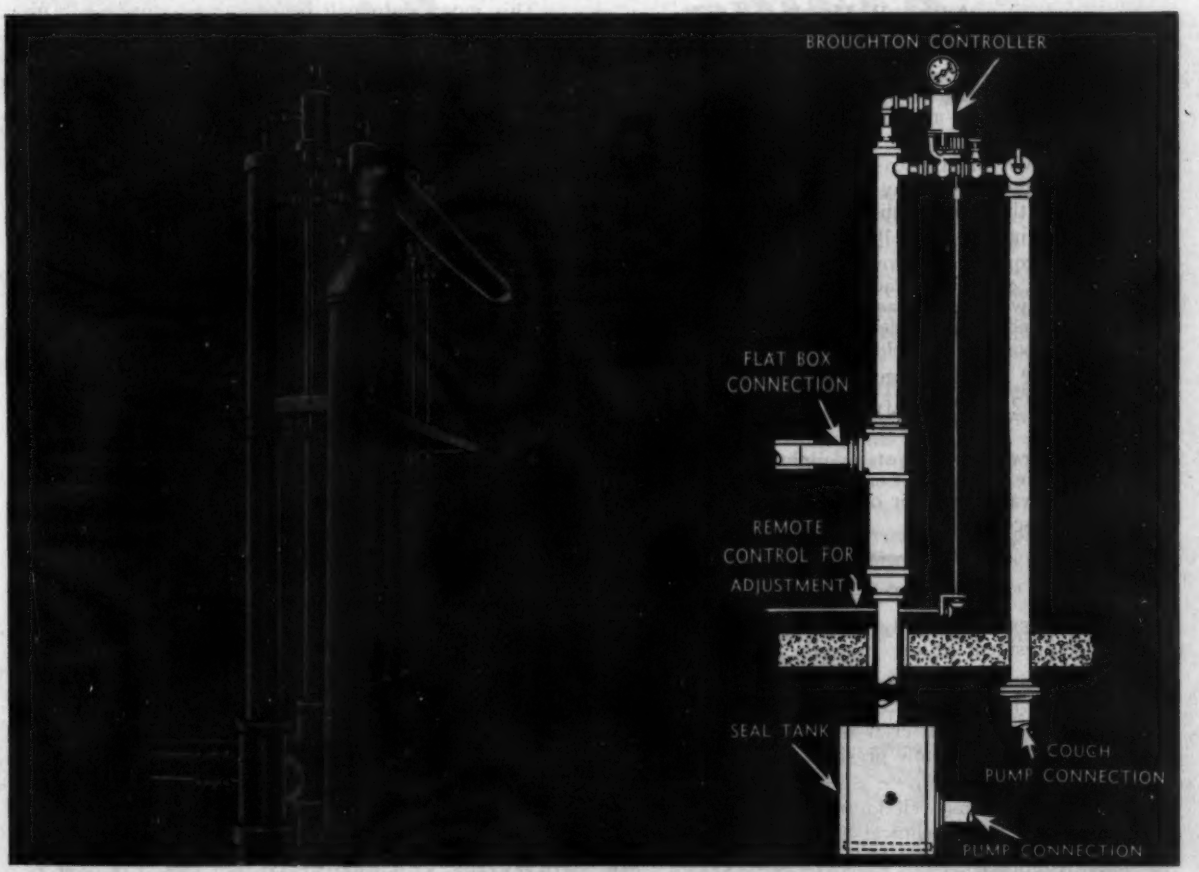


ARMY E NAVY

A. E. BROUGHTON & COMPANY
GLENS FALLS, N. Y.

Obituary

Calvin C. Yates

Calvin C. Yates, founder and president of the Eaton-Dikeman Company paper mill in Mt. Holly Springs, died suddenly Sunday night at his home in Upper Holly, Pa.

A native of Standish, Maine, his first experience in the paper-making business was in Mechanics Falls, Maine, later managing a mill of his own in Bridgeport, Pa. He returned to New England to manage a mill at Lee, Mass., which was destroyed by fire early in 1933. In April of that year he took over an abandoned mill at Mt. Holly Springs and removed the company there.

He was a member of the Mechanics Falls Methodist Church and was active in the Mt. Holly Methodist Church.

Mr. Yates is survived by his widow, Mrs. Mary Bingham Yates; a daughter, Mrs. T. L. Liversidge, Rossland Farms, Pittsburgh; a son, Olen V. Yates, Carlisle; four grandchildren and two great-grandchildren.

Burial was in Mechanics Falls, Me.

Archie B. Martin

Archie B. Martin, chairman of the board of directors of Pacific Mills, Ltd., and associated with the British Columbia pulp and paper industry from its early days, died of a heart seizure in San Francisco recently.

In 1912 Mr. Martin was made general manager of the Ocean Falls Company at Ocean Falls, following a survey of the firm's timber resources and properties for British interests. In 1915, the Ocean Falls company was acquired by Crown Willamette Paper company, which organized Pacific Mills, Ltd., for which Mr. Martin was engaged as general manager. Later he was appointed vice-president, and in 1918, president. The latter position he held until 1944, when he was raised to the board of directors.

From 1912 to 1924, Mr. Martin resided in Vancouver.

He is survived by a step-daughter, Mrs. Robert Norton, wife of Lieut.-Commander Norton of San Diego. He was a member of the Pacific Union Club, San Francisco.

Horace R. Hillegas

STRATHMERE, N. J., July 4, 1945—Horace R. Hillegas, vice-president of the Franklin Paper Company, Philadelphia, died at his summer home, here, on Wednesday, July 4th. Mr. Hillegas joined the Franklin company shortly after it was established in 1910 by Harry A. Jacobs, now president, and later became vice-president.

Mr. Hillegas was well known among the various mills and acted as technical adviser, particularly as regards special treatment of greaseproof and waterproof papers and boards. He was a member of the Technical Association of the Pulp and Paper Industry.

Mr. Jacobs, as president, will carry on the established policy of the company, such as has been performed during the past many years.

U. S. Enters International Group

WASHINGTON, D. C., July 11, 1945—The United States has participated in an international Pulp and Paper Working Group set up by the Combined Raw Materials Board to survey the requirements for supplies of pulp, newsprint, other paper and paperboard from northern European sources, and to make such recommendations as might be necessary to ensure the meeting of essential needs for these materials, it was announced today by Benton R. Cancell, director of the Forest Products Bureau, War Production Board.

Mr. Cancell is the United States member and chairman of the international working group, which includes representatives of the United Kingdom, Belgium, Denmark, France, the Netherlands and Norway.

Participation by the United States was motivated, Mr. Cancell said, by uncertainties of supplies of pulp and paper from Sweden, Finland and Norway; the desire to ensure the satisfaction of the essential needs of war-ravaged European countries from the sources of supply most readily available to them, and in the interest of conserving valuable shipping space.

As a result of the recommendations made to CRMB by the Pulp and Paper Working Group, some wood pulp may be made available for import by the United States during the next twelve months if shipping is available.

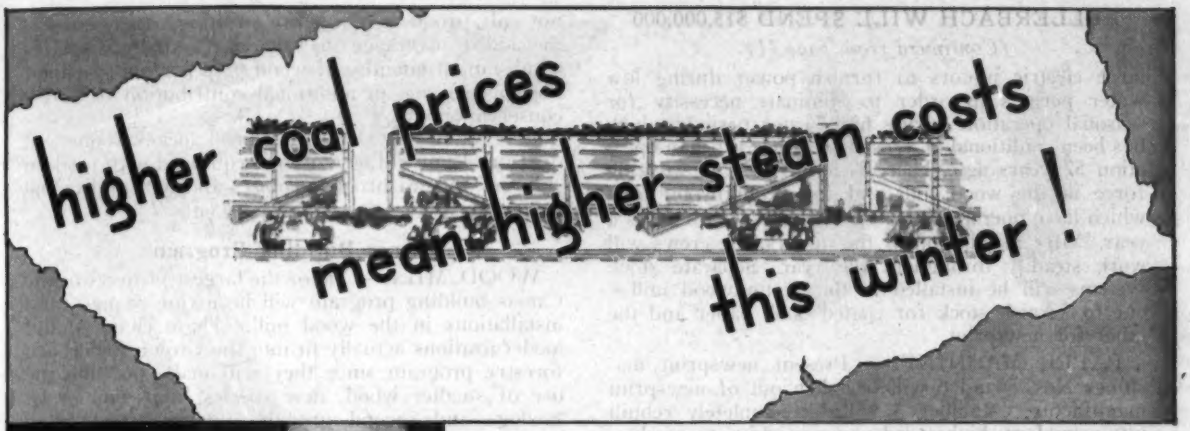
This wood pulp will be composed chiefly of sulphite and sulphate grades needed in this country to increase the production of all grades of paper and paperboard, and should tend to relieve the tight situations that prevails in the case of unbleached Kraft wrapping papers, grocery and variety bags, multiwall shipping sacks, printing and book papers, and many others. It should also make possible the gradual curtailment of the withholding of wood pulp from integrated producers, a measure that has been necessary during the war period to increase the supplies of market pulp available for consumption by semi-integrated and non-integrated mills formerly dependent upon Scandinavian sources for their supplies.

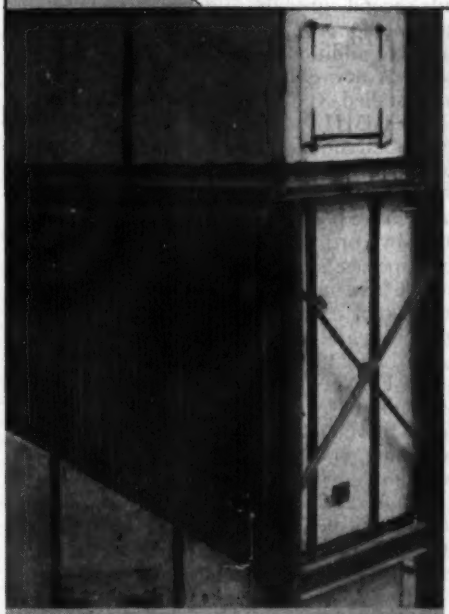
"A preliminary study by the Pulp and Paper Working Group indicates that supplies of paperboard and newsprint will be seriously short during the first twelve months after July 1, even though Scandinavian supplies begin to flow," Mr. Cancell said.

In the case of newsprint, he said, a special type of problem exists. The existence of a free press on the continent of Europe will be possible only if an adequate flow of newsprint is assured. The United States, therefore, has taken the position, with the full knowledge and approval of the War Production Board's Newspaper Industry Advisory Committee, that the United States will abstain from making purchases of newsprint from northern European sources until the minimum essential needs of other countries have been met.

Erb Returns to Stocker Manufacturing

NETCONG, N. J., June 26, 1945—Sgt. Arnot E. Erb, honorably discharged from the Armed Forces, has returned to resume his association with Fred Stocker of Stocker Manufacturing. Erb received his discharge after having completed 65 missions on the western front, with the Army Air Corps, where he served as an aerial gunner. Prior to his entry into the armed forces, Erb was acting in production and sales promotion capacities with Fred Stocker, when he was president of the Atlantic Gummed Paper Corporation.





Ross Briner Economizers can be conveniently installed on the roof or on machine room balconies. Our engineers can suggest ways to save floor space.

A GOOD REASON AND A GOOD TIME TO CHECK UP NOW ON YOUR

ROSS-BRINER Economizer

Reclaiming the heat from exhaust vapors to effect maximum steam economies is the objective of mill managers faced with steadily rising coal prices. Those fortunate enough to have Ross Briner Economizers are arranging to repair or modernize them. At this particular time, necessary replacements can be considered a paying investment.

Those who must install Ross Briner Economizers to greatly reduce their steam cost per pound of paper dried, are getting plans underway now in order to be ready for the heating season. It is none too early.

Every Ross Briner Economizer quickly pays for itself out of the savings it produces. These savings will prove even greater this coming Winter.

Now is the time to consult us on your particular problems and requirements.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORP.

DESIGNERS AND BUILDERS OF AIR PROCESSING SYSTEMS

350 MADISON AVE., NEW YORK 17, N. Y.

201 N. Wells St., Chicago-6 • 79 Milk St., Boston-9 • 12953 Greeley Ave., Detroit-3

ROSS ENGINEERING OF CANADA, LIMITED — Dominion Square Building, MONTREAL, P. Q.

CARRIER—ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

ROSS CONTROL OF AIR FOR MODERN INDUSTRY SYSTEMS

ZELLERBACH WILL SPEND $15,000,000

(Continued from page 11)

large electric motors to furnish power during low water periods in order to eliminate necessity for seasonal operation during high water periods which has been traditional at West Linn since it began operation 57 years ago. There is a fairly large working force in the wood mill and the groundwood mill, which have operated between six and seven months a year. After installation of the motors, the crews will work steadily throughout the year. Separate stock systems will be installed in the groundwood mill—one to furnish stock for coated book paper and the other for newsprint.

PAPER MACHINES — Present newsprint machines Nos. 5 and 6 will be taken out of newsprint manufacture. Number 5 will be completely rebuilt into a modern, high-speed paper machine to produce coated paper in reels 140 inches wide. Number 6 will be replaced by a new, high speed modern paper machine to produce coated paper in reels 155 inches wide. Each machine will have a complete coating section added and will be capable of producing machine coated book papers of high quality and at high speed, in a continuous process.

CHEMICAL PULP MILL—Crown Zellerbach's post-war plans provide for abandonment of the sulphite pulpmill at West Linn and the building of a new pulp mill using the alkaline pulping process. However, the re-building by the U. S. government of the locks at West Linn which run the entire length of the mill properties on the West side of the Willamette river necessitates the deferring of the construction of this soda mill, together with additional water filtration plant and an additional boiler installation, until the completion of this project by the government.

PULP BLEACHING PLANT—In order to serve the two coated book paper machines, a pulp bleaching plant of 75 tons daily capacity will be installed in a modern concrete building. This will later become a part of a bleaching plant to serve the future alkaline pulp mill.

FINISHING ROOM—The present wooden structure will be completely rebuilt into a large, modern three-story concrete building to house the Finishing Room. Installations in the Finishing Room will include a battery of three 14-roll super-calendar stacks 155 inches wide in addition to news finishing equipment to serve No. 9 newsprint machine. Coated book paper reels will be brought into the Finishing Room and run through the super-calendars in order to get the required finish and gloss for re-producing good photography and top quality printing, so essential in up-to-date magazines.

CLAY STORAGE—As great quantities of clay coating are to be used in the manufacture of coated magazine paper at West Linn, the clay storage and mixing equipment will require a large three-story, modern concrete building. In this building the clay with other chemicals will be mixed to a semi-fluid consistency, and pumped from the clay mixing room to the coating section of the paper machines. Principal sources of coating clays are from deposits in Georgia and England.

Manufacture of machine coated paper at West Linn is a historical departure for Crown Zellerbach Corporation, and will be the first time this grade will have been manufactured in large quantities on the Pacific Coast.

The use of coating on both sides of the book paper not only produces a superior printing paper, but has the added advantage that the clay actually displaces a substantial quantity of wood pulp per ton of paper, thereby making an additional contribution to forest conservation.

LOCKER ROOMS—A central locker room and dressing room will be built and equipped with modern showers and washroom facilities and with individual lockers to accommodate 750 workers.

Camas Building Program

WOOD MILL—One of the largest projects in the Camas building program will be major changes and installations in the wood mill. These changes and modernizations actually fit into the Crown Zellerbach forestry program since they will make possible the use of smaller wood, new species, non-commercial sawlogs and second growth and cordwood from nearby farm woodlots. A modern hydraulic barker will make possible additional wood savings in excess of ten per cent. A new chip storage will be built and new chippers installed.

NEW KRAFT MILL—An addition to the present kraft mill will accommodate a complete new kraft mill unit which will increase the total kraft mill capacity at Camas to about 350 tons every twenty-four hours and make possible a two-system kraft mill to manufacture two or more kinds of kraft pulp from different wood species. Installations in the new kraft mill will include five new rotating digesters, a new pulp washing room, a new lime kiln, high density stock storage chests and a complete new furnace and recovery system with Cottrell precipitator.

KRAFT SCREENING BUILDING — Added to the present sulphite bleach plant building a new modern concrete addition will be built to accommodate the kraft screening operation necessary to the expanded production.

KRAFT BLEACH PLANT — A large modern concrete building will be built to house a seven-stage bleach plant which will embrace all features of the most modern kraft bleach plants in the pulp-producing world.

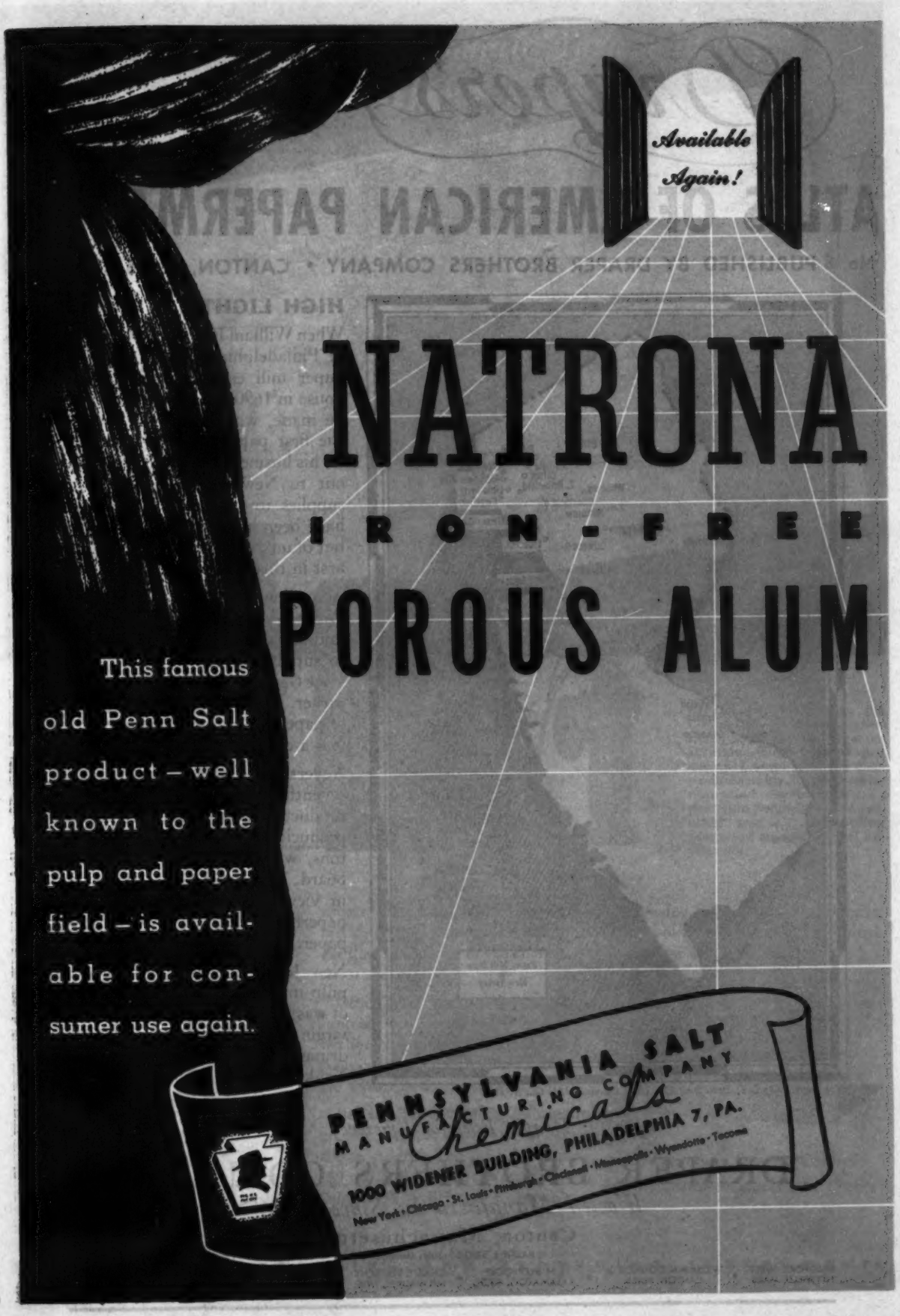
BOILER ROOM—A new high pressure, oil-fired boiler plant with a capacity of 135,000 pounds of steam per hour will be constructed. This will be the first of two such units to be ultimately installed at Camas.

FACIAL TISSUE MACHINE — As previously announced, a new facial tissue machine has been ordered and is already being built to be installed in the present machine room. This machine will be utilized to manufacture facial tissue and facial grade toilet tissue. Additional equipment will be installed to convert products from the new machine.

NEW MACHINE ROOM and FINISHING ROOM — A large, new, modern, concrete paper machine and finishing room building will be built, into which will be installed Number 15, a new modern Fourdrinier paper machine to make high quality grades of specialty papers. This machine will embody all the features of the most modern paper making machines.

New Pulp Plant in B. C.

PORT ALBERNI, B. C., July 5—Sulphate pulp for the manufacturing of rayon yarns will be produced at the new plant of Bloedel, Stewart & Welch, Limited, when it is completed. The company is now seeking from the British Columbia Government a supply of from 8,000 to 10,000 horsepower.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NATRONA
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POROUS ALUM
This famous old Penn Salt product – well known to the pulp and paper field – is available for consumer use again.
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Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 8 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS

Map copyright by L. D. Post, Inc., New York. American Map Co., N. Y.

HIGH LIGHTS:

When William Bradford, first printer of Philadelphia and partner in the paper mill established by Rittenhouse in 1690, moved to New York, he made, with his former partner, the first paper contract on record. As his business flourished he reached out to New Jersey for additional supplies to a paper mill known to have been in existence in the 1720s, but of unknown origin, although the first in this State.

According to Week's history of Paper Manufacturing, Bradford is said to have bought this mill in 1728 to supply his newspaper, *The New York Gazette*, established three years earlier. So little has been recorded of papermaking in New Jersey that it is a challenge to further research.

Nevertheless, New Jersey ranks seventh among the States in the production of paper and paperboard, producing annually about 780,000 tons, with an emphasis on paperboard. The latter fact is significant in view of the increasing ratio of paperboard production to that of paper.

New Jersey has 41 paper mills, no pulp mills, but is a large consumer of waste paper for re-use in place of virgin pulps. There are 20 Fourdriniers, 50 cylinder machines, 3 Yankees and 15 wet machines.

Draper Felts for Efficiency

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

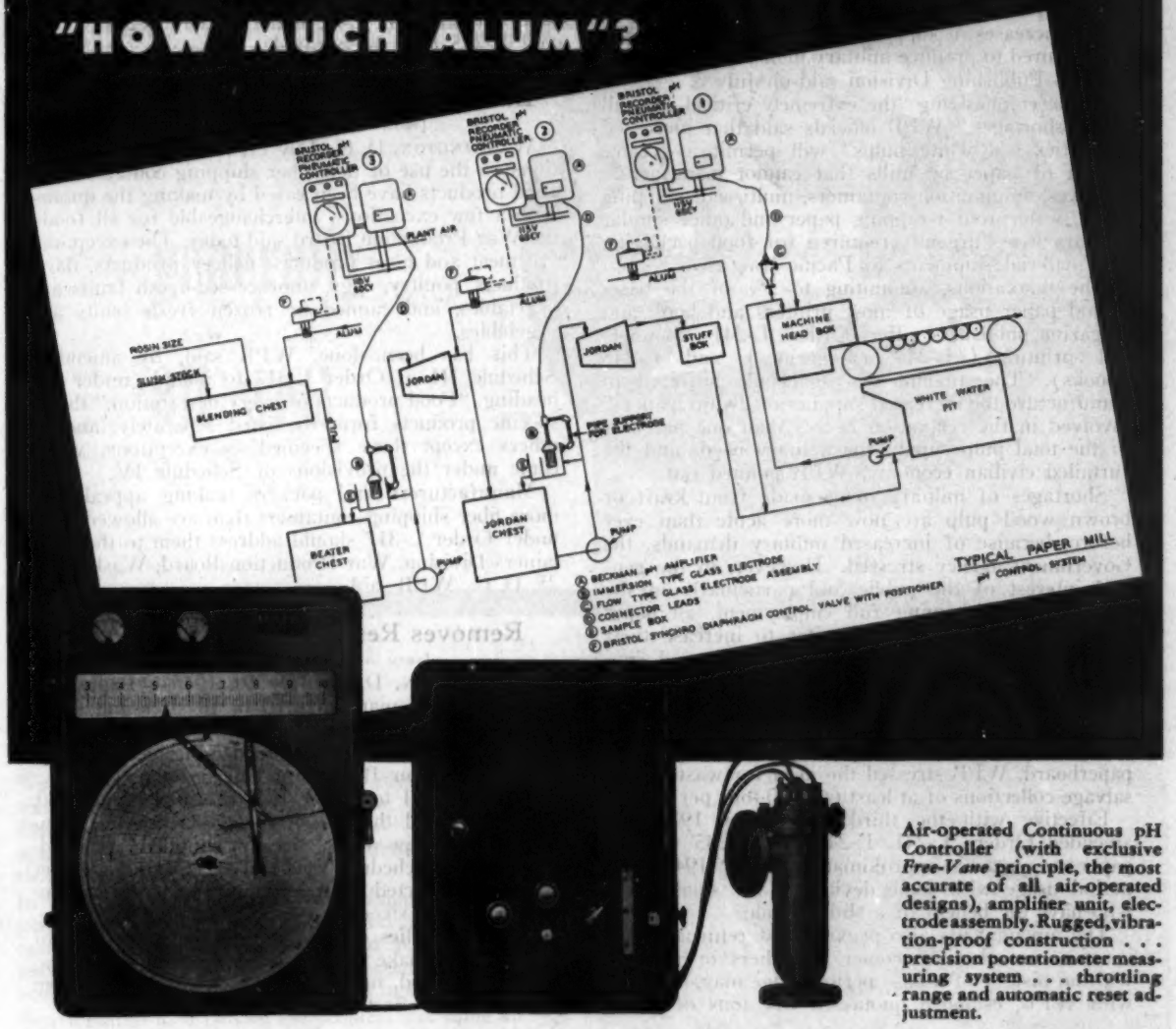
Canton, Massachusetts

RALPH E. BRIGGS Sales Manager

BRADFORD WEST PITTSFIELD, MASS. • WILLIAM N. CONNOR Jr CANTON, MASS. • L. H. BREYFOGLE KALAMAZOO, MICH. • CHAS. E. BERTSCHY MILWAUKEE, WIS. • W. L. CAMPBELL SAVANNAH, GA. • BALFOUR GUTHRIE & CO. Ltd. PACIFIC COAST

Continuous, Accurate, Automatic Answer to

"HOW MUCH ALUM"?



Air-operated Continuous pH Controller (with exclusive *Free-Vane* principle, the most accurate of all air-operated designs), amplifier unit, electrode assembly. Rugged, vibration-proof construction . . . precision potentiometer measuring system . . . throttling range and automatic reset adjustment.

In this typical continuous stock preparation system, foolproof control of pH is just a matter of using the right Bristol instruments at the right places.

Most important, of course, is the final addition of alum prior to the fan pump. Electrodes placed in the stock flow to the head box or in the white water coming from the wire pit continuously signal to the Bristol pH Controller how much alum should be introduced.

Once the Controller is set at the proper pH value, that value is automatically maintained ever after, regardless of changes in the character of the stock flow.

Other points where automatic pH control will guard product quality without the necessity of having to depend on periodic sampling for test . . . are shown in the diagram (2 and 3).

Bulletin pH 1300 gives information on the complete system illustrated above. Address The Bristol Company, 159 Bristol Road, Waterbury 91, Conn. (The Bristol Company of Canada, Ltd., Toronto, Ontario. Bristol's Instrument Co., Limited, London N.W. 10, England).

Engineers Process Control for Better Products and Profits

Broadens Use of Printing Papers

Paper usage restrictions on books, magazines and commercial printing have been relaxed slightly by amendments to War Production Board controls, WPB reported today. This was possible because of minor increases in supplies of certain types of paper not required to produce military items, WPB's Printing and Publishing Division said on July 3.

While emphasizing "the extremely critical over-all paper shortages," WPB officials said that increased quantities of "white pulps" will permit a greater output of paper by mills that cannot manufacture V-boxes, ammunition containers, multi-wall shipping sacks, waterproof wrapping paper and other similar military items urgently required for food packaging and material shipments to Pacific war areas.

The relaxations, amounting to 5% of the base-period paper usage of most printers and book and magazine publishers, affect Orders L-241 (commercial printing), L-244 (magazines) and L-245 (books). The amount of wood pulp required to manufacture the increased supplies of "white papers" involved in the relaxation is less than one per cent of the total pulp supply for military needs and the curtailed civilian economy, WPB pointed out.

Shortages of military items made from kraft or brown wood pulp are now more acute than ever before, because of increased military demands, the Government agency stressed. However, in the general interest of the public and particularly in the interest of maintaining full employment, all paper users will be permitted hereafter to increase their paper consumption in proportion to increased supplies of any types of paper that may become available for civilian use.

In order to meet rising demands by the military for greater quantities of most types of paper and paperboard, WPB stressed the need for waste paper salvage collections of at least 660,000 tons per month.

Effective with the third quarter of 1945, the amended Orders L-241, L-244 and L-245 will fix paper use quotas at approximately 80% of 1942 base-period usage with some deviations for small users who have the benefit of a sliding scale.

The amendments also provide that returning war veterans or other newcomer publishers or printers with no history of a base period usage may, on filing with WPB, establish quotas of five tons of paper per quarter under the magazine Order (L-244) and the commercial printing and duplicating order (L-241) and quotas of ten tons per paper for the last six months of 1945 under the book order.

The rigid delivery restrictions effective in the second quarter of 1945, under Orders L-241, L-244 and L-245 have been eased.

Eases Restrictions on Shipping Boxes

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 11, 1945—Quota restrictions on the use of new fiber shipping containers for food products have been eased by making the quotas, with a few exceptions, interchangeable for all foods, the War Production Board said today. The exceptions are meat and meat products, fishery products, dairy products, poultry, eggs, unprocessed fresh fruits and vegetables, and canned or frozen fresh fruits and vegetables.

This has been done, WPB said, by amending Schedule III of Order L-317 to include under one heading, "Food products of every description," the 29 specific products formerly listed separately, and all others except those specified as exceptions, which come under the provisions of Schedule IV.

Manufacturers and packers making appeals for more fiber shipping containers than are allowed them under Order L-317 should address them to the Containers Division, War Production Board, Washington 25, D. C., WPB said.

Removes Restrictions on Stationery

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 10, 1945 — Paper stationery may be manufactured in all sizes and styles and commercial type envelopes may have mechanical closures in addition to gummed adhesive flaps, the War Production Board announced today.

Schedule VII to Order L-120, issued August 30, 1943, restricted the use of metal closures on commercial envelope flaps already supplied with adhesive seals. Schedule VIII to L-120, issued October 23, 1943, restricted the manufacture of paper stationery to certain sizes, styles, weights and packaging. Increased supplies of steel for dies and mechanical closures now make the restrictive provisions unnecessary, WPB said, in deleting the two schedules from Order L-120, effective June 27. 1945.

Hooker Advances Two

H. M. Hooker and E. R. Bartlett have been advanced to new responsibilities by the Hooker Electrochemical Company. Harry M. Hooker, (left) who succeeded his brother as president of the company in 1938, has been elected chairman of the board of directors. Edwin R. Bartlett, (right) a director of the company since 1925, and executive vice-presidentsince 1941, has been elected president.

ONE OF 27 DOW CHEMICALS USED BY THE PULP AND PAPER INDUSTRY

mold is generally all wet!

HOW DOW FIGHTS MOLD ATTACKS

Water—indispensable to man—nevertheless causes many manufacturing headaches. Under certain conditions, it encourages the growth of mold—destructive mold that constantly harasses production in many industries.

In one step of paper making, for example, the wet pulp mass that eventually becomes finished paper is carried on felt belts and squeezed partially dry between rollers. Being subjected to constant dampness, the felt is up against continual mold attack.

Dow research men tackled the problem and came up with Dowicide—a germicide and fungicide that increases wet felt life as much as forty to sixty per cent. Paper manufacturing has benefited immeasurably.

Furthermore, Dowicide products have helped paper producers combat other mold attacks . . . they have aided in slime control, in preserving log and pulp stock, in making packaging papers mold resistant, in reducing maintenance costs.

Similar mold problems in the textile, lumber, paint, and other industries are being successfully reduced by a Dowicide specifically designed for the job. If you are bothered by molds, fungi, bacteria, or termites, write us to find out how Dowicide can help you.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit
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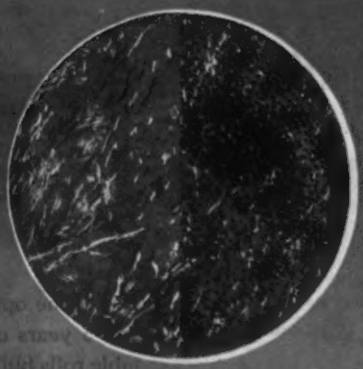

Dowicide

Germicides and fungicides

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

Turning the tables on wear and corrosion

These 4" diameter x 118" face rolls, built by the Black-Clawson Co., Hamilton, Ohio, serve as table rolls; others are used for felt rolls, guide rolls, submersion rolls.

> Our experience with these rolls has been very satisfactory and considerably better than with other types.
>
> We definitely plan to continue with them.

That's the opinion of a mill which has had 5 years of experience with Monel table rolls built by the BLACK-CLAWSON COMPANY.

And here are 5 good reasons why the corrosion-resistant tube roll you want is built from Monel:

NO SAG. *The seamless Monel tubing* from which these rolls are built, is practically *twice* as resistant to deflection as other non-ferrous metals ordinarily used. (Modulus of elasticity of Monel is 26,000,000 psi.)

LIGHTWEIGHT—yet STIFF. Monel's strength and high resistance to deflection permits relatively thin wall thickness.

CORROSION-RESISTANT. Monel resists corrosion and pitting by paper stocks and white waters, alkaline cleaning solutions or dilute sulfuric and hydrochloric acids.

INHERENTLY TOUGH and HARD. Monel rolls resist wear and grooving by doctors or abrasives in furnish. Average hardness of Monel tubes is 210 Brinell.

NO STRENGTH LOSS due to dezincification. Monel contains no zinc.

Cold-drawn, seamless Monel tubes for rolls are produced in diameters up to 5 inches, and in lengths over 20 feet. Full data on sizes, wall thicknesses and tolerances will be sent promptly upon request.

Ask also for Bulletin C-3, *Monel, Nickel and Inconel in Pulp and Paper Mills.*

THE INTERNATIONAL NICKEL COMPANY, INC.
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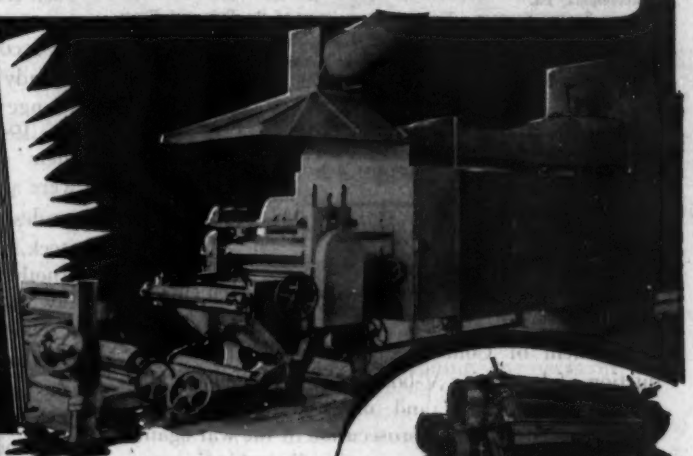
Sheet... Strip... Rod... Tubing... Wire... Castings... Welding Rods (Gas and Electric)

Plastics *Treated* Papers
provide remarkable new materials

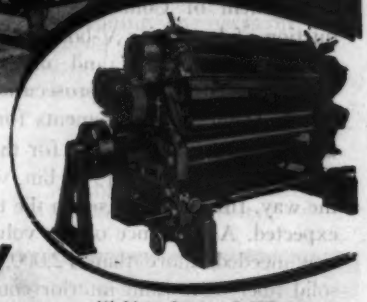
Reduced reproduction of article published in May issue of Plastics magazine



Waldron Treater System

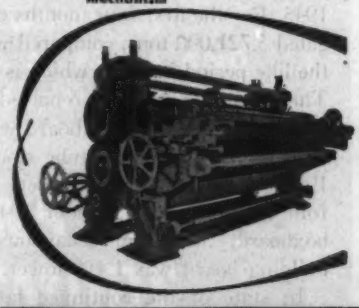
and the machines that make them possible are built by

WALDRON



Waldron Reverse Roll Coater for applying plastics solution

Waldron Treater Head equipped with reverse roll coating mechanism



The Waldron Treater System illustrated above is a complete machine line consisting of Waldron mechanical treating apparatus in tandem with Ross Engineering air processing apparatus.

They're the talk of the industry—Paper, Plastics and the WALDRON machines that wed them! Paper not only takes on new appealing beauty but achieves new desirable properties of strength, durability and resistance to heat and moisture. Whatever the specific treatment required, WALDRON machines are available to complete the job from unroll, thru treating and curing to the final rewind. Our Catalog No. 112 will point the way to new horizons for paper makers. Consult us on the possibilities for your product.

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BUILDERS OF QUALITY MACHINES SINCE 1827

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
W. L. Cook, Editor

COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

Empire State Section. Technical Association of the Pulp and Paper Industry—Second Thursday of each month at the Woodruff Hotel, Watertown, N. Y.

Chicago Professional Paper Group. Third Monday of each month except July and August at Chicago Bar Association, Chicago, Ill.

PAPERBOARD DEMANDS HIGH

Paperboard demands continue at a very high level as all-over government and civilian requirements are not completely satisfied. The latest report of the Department of Commerce states that, greater production of board for V-boxes, shell containers, bomb bands, fiber drums, and other military items is urgently needed for the prosecution of the war against Japan. Domestic requirements for fiber shipping containers show little increase for the third quarter over the second quarter of 1945, but, with reconversion on the way, further increases in the third quarter may be expected. As evidence of the volume of this material now needed, more than 72,000,000 corrugated and solid fiber boxes and interior containers were manufactured in March, out of which 54,000,000 V-boxes were required for overseas shipments.

Paperboard production for April, 1945, of all types, totaled 1,425,000 tons, compared with 1,402,000 tons in April, 1944, and with 1,527,000 tons in March, 1945. For the first four months of 1945 output aggregated 5,721,000 tons, compared with 5,676,000 tons in the like period in 1944, which is an increase of 0.8%. The largest increase is reported in folded boxboard which rose 7%, but cardboard was up 3.3%; containerboard up, 1.5%, and tube stock increased 0.9% in 1945 over 1944. Decreases were reported for the first four months of 1945 under 1944 as follows: set-up boxboard, 5.3%; miscellaneous board, 2.4%, and building board was 1.4% lower.

In spite of the continued large military requirements the board industry is planning for the reconversion period and V-J Day, the report goes on to state. Although most of the containerboard plants will not have to reconvert, manufacturers of fiber containers will have to change some equipment and install new machinery to meet new civilian packaging demands. After three years of operation much of the machinery needs more than ordinary repairs, and WPB has been requested to give consideration to such equipment problems, even though the machinery control Order L-83 has been revoked. It is obvious that mills could produce more paperboard and containers if adequate replacement equipment were made available.

Among the several changes in the control of paperboard by government agencies, OPA issued Amendment 21 to RPS 32, effective May 31, 1945, provided that buyers of paperboard west of the Rocky Mountains are no longer required to keep records of their purchases on file. Sellers are still required to keep such record, but when applications for individual ceiling adjustments are made, such applications need not be accompanied by financial reports if these reports already have been filed with OPA. Another important change requires manufacturers to furnish their March 31, 1943, paperboard ceiling prices, in writing, to their customers. Uniform dollar-and-cent ceilings were also established by this action for three specialty grades of paperboard: bomb band stock, tropical filler stock, and kraft ammunition shell containerboard. Another change permits manufacturers to reconvert raw materials owned by customers into paperboard, provided the conversion cost, plus raw material cost, does not exceed existing ceiling prices for the finished paperboard.

Conservation Order M-378, which controls production and reserves of paperboard was amended May 29 to meet increasing military requirements. The order fixes the monthly reserve production of paperboard at 50% of each producer's average monthly production during the corresponding quarter of 1944, so that direction 1 to the order can be revoked. The order defines production as a reserve of both time and supplies sufficient to produce and deliver the specified amounts of paperboard each month, and adds a new sentence to the paragraph which gives WPB greater flexibility for increasing or reducing a producer's percentage of reserve production.

An indication of the critical supply situation in containerboard is shown in the placing of solid and corrugated fiber shipping containers on the National production Urgency List early in May. This means that manufacturers of this type of paperboard and containers are entitled to the highest urgency ratings when seeking to replace labor losses or to increase the number of workers for additional production. Because of the serious shortage of shipping containers for high priority use, the WPB requested the Army and Navy and other Federal procurement agencies to take extraordinary measures for the prompt cancelation by military contractors and sub-contractors of all orders for shipping containers not required as a result of contract cancelations or reductions in production schedules. It is expected that the military demand for shipping containers will continue at a high level, owing to the tremendous shipping distances in the Pacific war, the requirements of our armies in Europe and the necessity for meeting other needs during the early period of military occupation.

Conservation of the strongest type of V-boxes, V-1, has been found necessary because this type of box and the next strongest, V-2, have proven adequate to the exacting use required. Conservation Order M-290, released on May 23, eliminates the use of these boxes in packaging and shipping certain products.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1945		Corresponding Weeks—1944	
May 26	92.0	May 27	90.0
June 2	87.9	June 3	86.1
June 9	92.8	June 10	90.7
June 16	91.5	June 17	91.5
June 23	90.4	June 24	90.8
June 30	88.8	July 1	86.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1944	88.7	88.5	88.1	87.6	88.7	89.8	80.3	90.6	88.2	92.5	90.6	82.4	88.1
1945	86.7	89.4	90.2	88.1	89.8	91.2							

COMPARATIVE YEARLY SUMMARIES

	1938	1939	1940	1941	1942	1943	1944	1945
Year to Date	67.4	79.5	87.2	92.7	97.9	88.3	88.6	89.0
Year Average	71.5	83.4	85.6	97.4	90.4	87.8	88.1	

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Current Weeks—1945		Corresponding Weeks—1944	
May 26	97	May 27	96
June 2	93	June 3	93
June 9	97	June 10	96
June 16	96	June 17	95
June 23	96	June 24	96
June 30	96	July 1	95

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1944	90	96	95	96	96	96	85	96	92	95	95	85	93
1945	91	95	97	97	96	96							

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

McDonald Named Chesapeake President

WEST POINT, Va., July 11, 1945—The Board of Directors of the Chesapeake Corporation have announced the satisfactory consummation of plans involving changes respecting the corporation's officials, such changes to be effective September 1, 1945. Elis Olsson, who has been associated with the management of the corporation since its organization, and who, since 1929, has been president and general manager, has been elevated to the newly created position of Chairman of the Corporation. Under Mr. Olsson the corporation has become one of the outstanding manufacturers of sulphate pulp, Fourdrinier kraft liner and kraft specialties in this country. Mr. Olsson will continue active in the guidance of the affairs of the corporation.

M. C. McDonald, of Monroe, La., succeeds Mr. Olsson as president. Mr. McDonald has been connected, in various capacities, with the Brown Paper Mill Company, Incorporated, of Monroe, Louisiana, for the past twenty-two years. Starting as resident engineer on construction, he was advanced to the office of assistant manager and plant engineer. In March, 1932, Mr. McDonald was made vice-president and general manager of the company, which position he has held to the present time. Previously Mr. McDonald was connected for four years with George F. Hardy, outstanding consulting engineers in the paper industry. Mr. McDonald attended the engineering school of the University of Michigan and served in World War I as an Ensign in the United States Naval Reserve.

The other officers of the corporation, remaining unchanged, are: W. C. Gouldman, vice president-secretary; J. P. Ekberg, vice president; O. D. Dennis, treasurer; and E. S. Gray assistant secretary.

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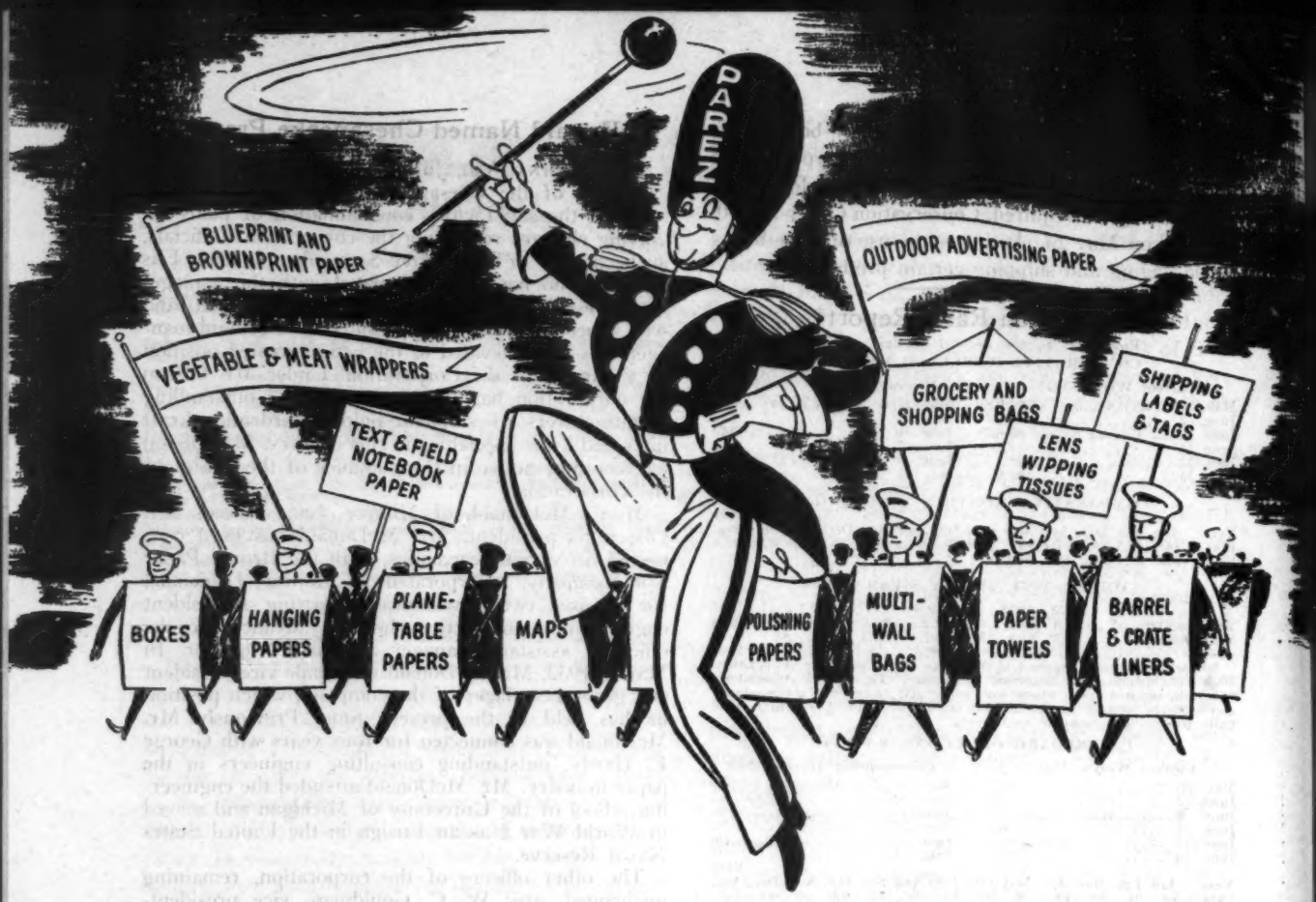

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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Flexural Resistance and Deflection of Fiberboard*

TAPPI Suggested Method T 469 sm-45

This method is for determining the flexural resistance and the deflection at failure of fiberboards which are subjected in use to high stresses, such as binders board, insulating board, wall board, and hard-pressed structural board. The method is suitable for measuring the stiffness of a sheet of fiberboard as such but the results are not in themselves a measure of the expected rigidity or resistance to compression of structures made from the board and should not be used for that purpose.

Apparatus

1. *Tensile Tester* as specified in TAPPI Standard T 404 m, preferably equipped with a recording device which gives a graphic record of the applied load and deflection. (*See* note below.)

2. *Flexural Loading Device.* This device, shown in Fig. 1, is in two parts. The stirrup, *A*, is provided with a tab for clamping in the upper clamp of the tensile tester. The bearing surface at the bottom of the stirrup is a smooth metal cylinder. The stressing attachment, *B*, carries an inverted stirrup at each end, similar to stirrup *A*, such that the cylinders are parallel with each other, and a tab in the center to be clamped in the lower (stressing) clamp of the tensile tester.

The span (distance between centers of the two cylinders in attachment *B*) must be suitably chosen according to the rigidity of the material to be tested and the capacity of standard tensile testing apparatus. The diameter of the cylinders used in the three stirrup supports shall be 3/8 inch.

Note: Any equivalent means of applying a measurable load to the center of a supported strip of the specimen and measuring the deflection may be used.

3. *Scale.* If the tensile tester or other apparatus used is not equipped with a device for recording the deflection, it may be measured with a scale graduated in 0.01 inch.

Test Specimen

The length of span shall be so chosen that the deflection of the specimen at the instant of rupture or at maximum loading, is 1.0 ± 0.5 inches. The length of the specimen shall be at least 2 inches longer than the span chosen and the width not less than 1 inch, but as narrow as practicable for the type of apparatus used. Standard dimensions of test specimens for the usual types of boards for which this method is applicable are given in Table I, but it may be necessary to vary the size of specimen tested, depending on the type of board tested or the apparatus available.

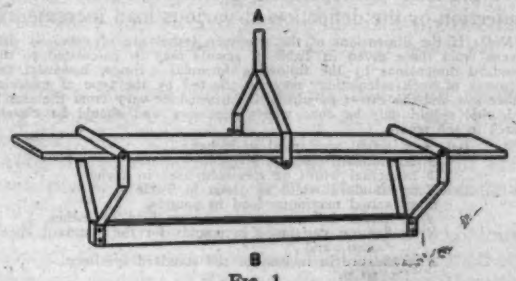

FIG. 1
Flexural Loading Device

TABLE I.—DIMENSIONS OF TEST SPECIMENS

	Specimen Length *inches*	Specimen Width *inches*	Span *inches*
Binders Board (*2, 3*)	5	1	3
Hard-Pressed Structural Board (*7*)	12	3	8
Insulating Board (*1, 4*) and Wallboard (*1, 5, 6*)	18	3	12

The test specimens shall be cut accurately and parallel to within 1/32 inch, and with clean edges, in each principal direction of the fiberboard.

The specimens shall be conditioned for testing according to TAPPI Standard T 402 m.

Procedure

The tests shall be made in an atmosphere conditioned according to TAPPI Standard T 402 m.

Using the tensile tester, fasten attachment *B* in the lower (stressing) clamp of the tensile tester with the axes of the two cylinders in a plane perpendicular to the direction of movement of the clamp. Fasten stirrup *A* in the upper clamp with its cylinder parallel to the other two and so that it will load the specimen at midspan. Counterweight the stirrup *A*, or determine the scale correction necessary to compensate for its weight. Run up the lower clamp with the attachment *B* until the specimen can be inserted, without bending it, under the two end cylinders and over the one at midspan, leaving equal lengths projecting at the two ends. Apply the load according to TAPPI Standard T 404 m until the specimen breaks or until

* This method is suggested by the Paper Testing Committee as being the most suitable to date. It is not, however, a TAPPI Standard. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y. Reprints of this method may be obtained from the Secretary at 25 cents each.

after a maximum load has been reached. If the testing instrument does not have a recording device for the amount of deflection at maximum load, measure it with the scale. Allow one end of the scale to rest on the lower clamp and read the scale opposite a reference line on the upper clamp at the instant loading is begun, at chosen intervals of loading, and at the instant of failure or maximum load.

Tests shall be made on not less than five specimens cut from each of the two principal directions of the board.

Report

The results shall be reported to two significant figures as the average flexural resistance (load at failure, or maximum load in case there is no failure) in pounds and the deflection in inches in both principal directions of the sample for the dimensions of the specimen beams tested.

The report shall state the length of span used and the width and thickness of the specimen. It may also give the load corresponding to various increments of deflection or the deflection at various load increments.

Note: If the dimensions of the specimen tested are of necessity different from those given in Table I, results may be calculated to the standard dimensions by the following formulas. Since, however, the accuracy of such calculations may be affected by the type of material under test and the extent to which the dimensions vary from the standard, this should only be done where necessary and should be clearly stated in the report.

Let s = actual span used in inches,
S = standard span as given in Table I,
b = actual width of specimen used in inches,
B = standard width as given in Table I,
w = actual maximum load in pounds,
d = actual deflection at maximum load in inches,
R = flexural resistance in pounds for the standard specimen, and
F = flexure in inches for the standard specimen.

Then, $R = \frac{WsB}{bS}$ and $F = d\ \frac{S^2}{s^2}$.

Additional Information

For engineering purposes, the modulus of flexural rupture may be calculated by the following formula:

Let S = length of span in inches,
B = width of specimen in inches,
t = thickness in inches adjacent to rupture,
W = load at rupture in pounds, and
M = modulus of flexural rupture in pounds per square inch.

Then, $M = \frac{3\,WS}{2\,Bt^2}$.

Note: There does not appear to be sufficient data available at present to set up a formula for modulus of transverse strength or for modulus of elasticity, applicable to the materials covered by this method. Moreover, it is questionable if these are of practical use for such materials.

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3. National Bureau of Standards Commercial Standard CS50-34, "Binders Board for Bookbinding and Other Purposes."
4. Federal Specification LLL-F-321, "Fiberboard; Insulating."
5. Federal Specification UU-W-101, "Wallboard, Composition."
6. National Bureau of Standards Commercial Standard CS112-43, "Homogeneous Fiber Wallboard."
7. Federal Specification LLL-F-311, "Fiberboard; Hard-Pressed, Structural."

New TAPPI Members

Clifford R. Swett, Technical Director, National Wax Co., 1300 W. Division St., Chicago, Illinois, a 1927 graduate of Pratt Institute.

Hobart F. Woodward, Patent Officer, Minnesota & Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis, Minnesota Attended U. S. Naval Academy and Georgetown University, receiving degrees in Law and Electrical Engineering from George Washington University in 1927.

Hercules Offers New Coating Material

Menthylphenol, a new chemical which improves the heat and light stability of ethyl cellulose plastics, film, plastic peel, adhesives and paper coatings, is now commercially available, according to an announcement by Hercules Powder Company.

The chemical is a terpene hydrocarbon derivative and is another result of the extensive research in terpene chemicals being carried on by Hercules. Menthylphenol is a white opaque semiamorphous solid and can also be used as a plasticizer extender with cellulose acetate.

Research data shows that menthylphenol, formerly known as Stabilizer X, is outstanding in preventing ethyl cellulose plastics from becoming brittle and at the same time greatly minimizing the change of color of moldings.

Ethyl cellulose film containing menthylphenol possessed greater flexibility and considerably less surface cracking after exposure tests than film without stabilizer. The films were subjected to 60 days of outdoor summer exposure at Wilmington, Del.

The optimum amount of menthylphenol found useful with ethyl cellulose is one to three per cent based on total solids of the mix. Amounts less than one per cent do not have sufficient stabilizing effect, and amounts greater than three per cent do not appear to give any appreciable increase in stability.

Towmotor Announces New Guide

A new "Materials Handling Analysis Guide" has just been published by Towmotor Corporation, manufacturer of power lift trucks and industrial tractors. It is being offered to anyone interested in locating and analyzing handling problems in factories, terminals and warehouses. It is believed to be the first booklet any manufacturer has published on this subject.

The 36-page pocket size booklet, which discusses handling from an executive viewpoint, is divided into three major sections: (1) "How To Tell If You Need Better Handling Methods"; (2) "Analyzing The Problem"; and (3) "Determining The Solution To Your Problem." There are 31 illustrations which help to point out ways of improving handling methods. All the well-known types of power handling equipment are illustrated and discussed with the object of determining their ability to meet requirements. This Guide is impartial, informative and helpful. It may be obtained by writing, on your company letterhead, to Towmotor Corporation, Cleveland 10, Ohio.

P. & J. Will Expand Facilities

Wilmington, Del., July 12, 1945—The Pusey and Jones Corporation will spend about $1,000,000 after the war to expand its facilities for manufacturing paper-making equipment, an official of the firm said yesterday. The firm has recently received inquiries for the manufacture of $25,000,000 worth of such machinery.

The plant expansion will include the extension of the machine shop and the conversion of a building from its present use as part of the shipyard to assembly space for paper-making machinery. The plans also call for replacement of machine tools.

When the firm eventually gets the potential orders for the machinery, approximately 500 additional workers would be needed, it was estimated. The projected expansion is not dependent on obtaining specific orders, however.

Refined Neutral Sulphite Semichemical Pulps from Douglas Fir*

By Harold E. Peterson[1], Mark W. Bray[2], and George J. Ritter[3]

Abstract

Exceptionally strong, bleached pulps of high yield were made from Douglas fir by purification of neutral sulphite semichemical pulps by the holocellulose method. A yield of 57% of bleached pulp, the alpha-cellulose content of which was 87%, was realized. The alpha-cellulose recovered in this instance amounted to approximately 50% of the moisture-free weight of the wood.

Test beater strength data indicated that the bursting strength of this highly purified pulp was much higher than sulphite and considerably higher (approximately 18%) than unbleached kraft pulp made from an identical sample of the wood. The high yield of alpha-cellulose and its viscosity (43.0 centipoises in cuprammonium solution) indicated that little degradation of the cellulose had resulted from its preparation. Owing to the hemicelluloses present, the bleached pulp hydrated very rapidly in the test beater, requiring only approximately 20 minutes to attain the maximum bursting strength. Further processing to a condition approximating that required for greaseproof or glassine type of paper was accomplished without loss in bursting strength.

Removal of various amounts of the hemicelluloses by extraction with caustic soda solutions of varied concentration changed the physical properties of the pulp and increased its whiteness. By such a treatment the pulps developed strength more slowly to lower bursting and tensile strengths, but showed an increase in resistance to tear. The data indicate that pulps equal in strength to those prepared from spruce by the same method, can be made from Douglas fir.

The vast quantities of Douglas fir available in the western United States have thus far found little use in the pulping field because of the inferior quality of the products obtained by the several commercial pulping processes. Although Douglas fir pulps usually have high tearing strength, this feature alone does not compensate for their poor felting qualities, their comparatively low bursting and tensile strengths, and for low pulp yields, especially when this species is cooked for bleaching and for alpha-cellulose.

Since it was not definitely known whether the low strength properties of Douglas fir pulps were due to properties inherent in the wood or its fiber or to degradation of the cellulose chains and the removal of certain fractions of the cellulose by the common commercial pulping methods, it was decided to try the mildest pulping methods known. The holocellulose method is known to remove lignin without perceptibly attacking either the cellulose or the hemicelluloses of wood *(1)*. Recent experiments *(2)* conducted at the Forest Products Laboratory indicated that stronger pulps than those prepared by the sulphite process can be made from white spruce by the application of the holocellulose method to wood that had been previously fiberized by an Asplund machine.

Owing to difficulties of chlorine penetration and the removal of reaction products from pulpwood chips of the size commonly used in commercial pulping operations, the holocellulose method has been found to be applicable only to finely divided or previously fiberized wood *(2)*. The mild action of the neutral sulphite semichemical process *(3)* produces a softened chip of high yield, which is easily fiberized by mechanical means without seriously attacking the cellulose.

Hence, this method offered possibilities of rendering pulpwood chips suitable for further purification by the holocellulose method *(4)*. Douglas fir chips were, therefore, subjected to the mild action of these two procedures for the production of a bleachable pulp of high strength and yield.

For comparison with pulps made by this combination of the semichemical and holocellulose methods, identical samples of Douglas fir chips from the same bolt were pulped by the standard sulphate process under conditions suitable for the production of high strength kraft and bleachable pulps. In addition, a comparison was made with sulphite pulps prepared from wood taken from the same position in a similar tree of like growth characteristics.

Raw Material

The Douglas fir *(Pseudotsuga taxifolia)* pulpwood used in these experiments was part of a shipment

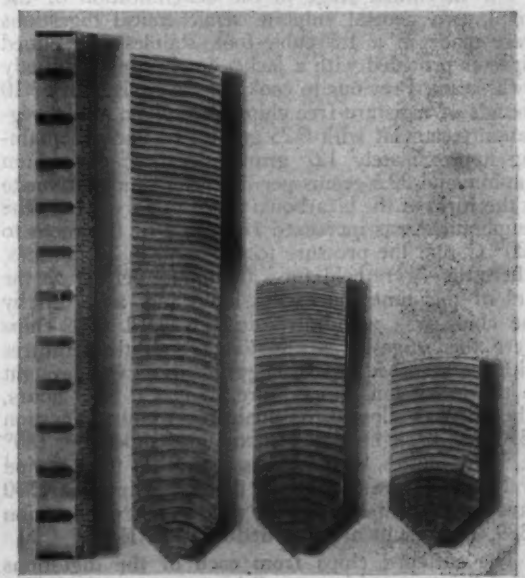

FIG. 1

Portions of Disks Cut from the Butt, Middle (Log 11), and Top Logs, Respectively, of Tree 2, Douglas Fir Pulpwood. Shipment 1528.

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* Presented by title at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Collaborator, Forest Products Lab.,[4] Forest Service, U. S. Dept. of Agriculture.

[2] Member TAPPI; Senior Chemist, Forest Products Lab.,[4] Forest Service, U. S. Dept. of Agriculture.

[3] Senior Chemist, Forest Products Lab.,[4] Forest Service, U. S. Dept. of Agriculture.

[4] Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

TABLE I.—PHYSICAL AND CHEMICAL DATA ON DOUGLAS-FIR PULPWOOD. (SHIPMENT 1528)

	Tree 2, log 11	Tree 1, log 11
	Location in Tree	
Physical Data	Middle	Middle
Age, annual rings	41	37
Rate of growth, rings per inch	5.3	4.8
Density, pounds per cubic foot	24.9	27.0
Dryness[1] of wood, %	54.0	57.9
Heartwood by volume, %	59	56.6
Springwood by volume, %	78	71
Chemical Data	%	%
Total cellulose	60.6	61.3
Alpha-cellulose	44.3	45.7
Lignin	27.3	25.6
Total pentosans	5.8	8.5
Pentosans in cellulose	6.4	7.1
Solubility in:		
Alcohol-benzene	2.6	4.0
Ethyl ether	1.5	1.1
1% NaOH	14.5	11.7
Hot water	4.5	4.7

[1] Moisture content = 100—Dryness value.

(1528) cut in Snohomish County, Washington, and supplied through the cooperation of the Pacific Northwest Forest and Range Experiment Station. The wood used for these and the sulphate pulping experiments was selected from the middle 4-foot section (tree 2, log 11) of a young, rapid-growth tree. Portions of disks cut from top, middle, and butt logs of tree 2 are shown in Fig. 1. The wood used for the sulphite pulping experiments was also taken from a log midway up a tree (tree 1, log 11) of similar growth characteristics from the same vicinity. The physical properties and chemical analysis of the wood from these two bolts are reported in Table I.

From these data the wood appeared to be in sound condition. The low pentosan content is characteristic of Douglas fir and certain other western species.

The wood was hand-peeled and converted into ⅝-inch chips by a two-knife, 48-inch chipper running at 500 r.p.m. The over- and under-sized material and knots were removed from the good chips by a shaker screen and hand sorting. The entire batch of chips was thoroughly mixed and stored until used in covered metal containers in a cold room (40° F. and 93% relative humidity).

Pulping Experiments

For the initial stage in the delignification of the wood, two neutral sulphite semichemical digestions were made in a 1.5 cubic-foot, stainless steel-lined digester provided with a jacket for heating indirectly with steam. Previous to cooking, the equivalent of 10 pounds of moisture-free chips were given an impregnation treatment with 6.25 gallons of liquor containing approximately 127 grams per liter of sodium sulphite and 22.5 grams per liter of sodium carbonate in the form of the bicarbonate. For this treatment, the temperature was increased from that of the room to 120° C. and the pressure to 125 p.s.i. in 30 minutes, where they were held for a 60-minute period. At the end of this time the excess liquor not absorbed by the chips was withdrawn and analyzed. The chips were then digested at relatively high temperatures with the absorbed liquor. Digestion 1389 was brought to the maximum temperature, 173° C., in 2 hours, where it was allowed to remain for 1 hour. Digestion 1390 was brought to the maximum temperture, 180° C., in 5 minutes, where it was again held for a period of 1 hour before cooling the digester. Digestion 1390 gave approximately the same yield as that of digestion 1389. The results are recorded in Table II.

The softened chips from each of the digestions were disintegrated in a small beater and washed. The pulps were allowed to remain in the beater for only a

TABLE II.—NEUTRAL SULPHITE SEMICHEMICAL PULPING DATA ON YOUNG-RAPID GROWTH DOUGLAS FIR (TREE 2, LOG 11), SHIPMENT 1528

| Cooking and Yield Data | | |

TABLE III.—CHEMICAL ANALYSIS AND PHYSICAL PROPERTIES OF SELECTED PULPS FROM DOUGLAS FIR (SHIPMENT 1528)

Test Number	Digestion Number	Description and Treatment of Material	Total yield on moisture-free wood, %	Total Cellulose Cross and Bevan: In sample, %	Total Cellulose Cross and Bevan: On moisture-free wood, %	Alpha-Cellulose: In sample, %	Alpha-Cellulose: On moisture-free wood, %	Lignin: In pulp, %	Lignin: On moisture-free wood, %	Total pentosans in sample, %	Chlorine Number (Roe)	Viscosity, c.p.	Bleaching Data: Standard bleach added, %	Ives Reading: Red, parts	Ives Reading: Green, parts	Ives Reading: Blue, parts	Interpolated Beater Strength Data on Pulp Tests Made at 75° F. and 50% Relative Humidity: Freeness (Schopper), ml.	Time of treatment, min.	Rm. wt. (35×40—500), lb.	Burst factor, points per pound per ream	Tear factor, points per pound per ream	Tensile strength, pounds per square inch	Solid fraction, ratio	Folding endurance, double folds	Stretch, %	Permanganate Number
7015	....	Douglas fir wood, tree 2, log 11...	100	60.6	60.6	73.1	44.3	....	27.3	5.8	....	....	....	..	..	..	....	....	....	....	....	....	....	....	..	..
7783	1389	Neutral sulphite semichemical pulp.	77.7	72.6	56.4	59.6	46.3	18.6	14.5	7.5	21.5	...	0	42	29	23	895	0	54	0.00	0	0	0.11	0	0	..
													25	59	42	31	700	58	51	0.63	1.02	4200	0.34	76	3.0	..
													50	67	53	41	550	70	51	0.70	.88	5550	0.39	81	3.3	..
7784	1390	Neutral sulphite semichemical pulp.	76.7	73.8	56.6	60.8	46.6	18.8	14.4	7.1	22.0	...	0	49	34	27	900	0	57	0.05	.60	0	0.12	0	0	..
													25	62	45	33	700	58	53	0.63	1.02	4200	0.34	100	3.5	..
													50	72	60	44	550	70	51	0.70	.88	5550	0.39	90	3.5	..
7824	....	Holocellulose[1] (unbleached) prepared from cooks 1389-90.....	57.2	100	57.2	87.1	49.8	0	0	6.9	...	43.5	0	77	68	60	875	0	58	0.74	3.08	3200	0.34	225	7.3	1.5
													1.0	86	82	80	700	24	54	1.27	1.64	7600	0.46	488	6.0	..
																	550	32	53	1.44	1.32	10100	0.50	450	6.6	..
7823	....	Bleached holocellulose[1]	57.2	...	...	86.7	49.5	...	...	6.6	...	43.0	1.1	84	80	79	880	0	60	0.54	2.98	2530	0.34	69	5.5	1.0
																	700	25	54	1.51	1.64	9250	0.44	500	5.7	..
																	550	36	53	1.55	1.36	10800	0.49	400	6.7	..
7823	A	Bleached holocellulose[1] extracted with 2% NaOH 2 hours at 95° C...	52.8	...	...	86.4	45.6	...	...	5.93	...	46.8	...	..	..	..	...	..	..	...	...	....	...	...	..	..
7823	B	Bleached holocellulose[1] extracted with 2% NaOH 3 hours at 95° C...	53.0	...	...	86.2	45.6	...	...	5.76	...	44.0	...	..	..	..	...	..	..	...	...	....	...	...	..	..
7823	C	Bleached holocellulose[1] extracted with 3% NaOH 3 hours at 95° C..	50.9	...	...	87.1	44.3	...	...	6.21	...	42.1	...	..	..	..	...	..	..	...	...	....	...	...	..	..
7823	D	Bleached holocellulose[1] extracted with 4% NaOH 3 hours at 95° C...	49.7	...	...	88.4	43.9	...	...	6.18	...	44.3	...	..	..	..	...	..	..	...	...	....	...	...	..	..
7888	E	Bleached holocellulose[1] extracted with 2% NaOH 2 hrs. at 75-80° C.	51.3	...	...	88.0	45.1	...	...	5.08	...	26.5	0	80	76	71	890	0	60	0.17	1.80	900	0.28	3	5.5	..
																	700	32	54	0.99	1.76	5700	0.46	400	6.5	..
																	550	40	53	1.08	1.40	7100	0.49	530	7.0	..
7921	F	Bleached holocellulose[1] extracted with 10% NaOH 2 hrs. at 50-60° C.	47.3	...	...	89.6	42.4	...	...	1.73	...	20.2	0	90	88	85	895	0	66	0.00	0.35	0	0.18	0	0	..
																	700	96	54	0.65	2.20	3400	0.40	113	4.5	..
																	550	123	54	0.74	1.72	4700	0.44	400	6.0	..
7920	G	Bleached holocellulose[1] extracted with 10% NaOH 2 hours at 25° C..	48.7	...	...	95.4	46.4	...	...	1.60	...	36.7	0	88	86	83	885	0	62	0.06	0.58	101	0.20	0	1.5	..
																	700	114	54	0.69	2.53	3800	0.38	192	5.0	..
																	550	148	62	0.81	1.88	5100	0.42	449	5.5	..
7174	1199	Kraft pulp (unbleached).....	48.5	92.3	44.8	76.7	37.2	5.2	2.5	7.2	5.3	...	0	38	27	22	880	0	61	0.30	2.40	1344	0.26	6	5.0	..
	1200												25	76	62	48	700	48	57	1.21	2.70	7000	0.44	2000	7.5	..
	1201																550	64	54	1.28	2.10	8400	0.49	3300	6.0	..
7323	2514	Bleachable sulphate pulp (unbleached)	44.2	96.6	42.7	82.5	36.5	2.4	1.1	6.4	2.8	38.8	...	...	...	...	860	0	64	0.34	2.70	1590	0.28	9	4.8	..
	2515												0	46	36	32	700	57	56	1.06	2.60	6700	0.46	1500	6.3	..
													25[2]	90	85	80	550	75	55	1.09	2.00	8100	0.51	1400	5.5	..
7339	2514	Bleached sulphate pulp. Bleach																								
	2515	No. 520	...	...	...	89.7	...	...	...	...	...	9.8	22.5[3]	90	88	86	870	0	57	0.47	3.8	1975	0.30	94	5.8	..
																	700	49	56	1.00	1.6	6400	0.45	903	6.3	..
																	550	68	58	1.05	1.3	7700	0.50	931	5.2	..
7240	3900	Sulphite pulp (unbleached) (tree 1, log 11)	51.1	93.6	47.8	78.3	40.0	2.3	1.2	4.1	4.8	59.8	0	49	37	31	880	0	59	0.23	1.5	1786	0.34	4	3.0	..
												15.1	25[3]	90	86	81	700	28	57	0.77	1.2	6300	0.49	481	4.5	..
																	550	40	60	0.79	0.9	6100	0.54	413	4.8	..
7450	A	Bleached spruce holocellulose. From Asplund fiberized wood, extracted with 5% NaOH at 95° C.....	58.1	...	...	89.6	52.0	...	...	...	...	37.4	0.5	92	90	86	870	0	..	0.46	2.7	2200	0.35	50	..	..
																	700	60	..	1.34	1.52	8000	0.57	1400	..	..
																	550	83	..	1.43	1.30	9000	0.54	1450	.	..

[1] Prepared from neutral sulphite semichemical pulps (1389 and 1390) by the holocellulose method.
[2] Bleached in one stage with calcium hypochlorite solution.
[3] Bleached in five stages by chlorination, caustic extraction, calcium hypochlorite, and sulphur dioxide.

short time without weight or pressure applied to the beater roll in order to avoid hydration of the pulp. The Schopper-Riegler freeness values of the disintegrated pulps were approximately 900 ml.

Previous to further purification by the holocellulose method, the pulps were screened through a small 8-cut screen plate, and tested for their strength properties, chlorine requirement, and chemical composition. The results of these tests are also reported in Table II. The data on cooking chemicals and yields are based on the calculated weight of moisture-free chips, while chlorine consumption and the results of chemical analysis are based on the weight of moisture-free pulp tested.

Testing the Pulps

The strength properties of the unbleached neutral sulphite semichemical pulps were determined by testing sheets prepared from stuff processed in 360-gram (moisture-free) portions in 23 liters of water (25° C.) for definite intervals in a 1.5 pound standard testing beater provided with a 6500-gram weight on the bedplate. For the unbleached holocellulose* and the bleached holocellulose and extracted pulps 5500-gram and 4500-gram weights, respectively, were used. The colors of the bleached and unbleached pulps were determined by an Ives tint photometer. All the pulps were chemically analyzed for their cellulose, alpha-cellulose, lignin, and pentosan contents, and for their chlorine requirements according to standard methods. The analytical data are recorded in Table III.

Purification of the Pulps by the Holocellulose Method

The two neutral sulphite semichemical pulps were thoroughly mixed and converted into unbleached holocellulose by chlorination with chlorine water and extraction of the lignin chloride with alkaline solutions. In order to minimize the formation of hydrochloric acid, which would cause undesired hydrolysis of the cellulose during the chlorination treatment, the chlorine water was freshly prepared before each chlorination by saturation of water at room temperature with chlorine gas. The pulp was divided into four 2.5-pound (moisture-free equivalent) batches for these treatments. The chlorine water added to a water suspension of the pulp was allowed to react for 15 minutes at room temperature, when the treated pulp was thoroughly washed on a 70-mesh wire screen and subsequently pressed to a moisture content of 75%. The pressed pulp was then extracted for 15 minutes in a steam-jacketed, glass-lined kettle with a hot (80° C.) 1% solution of monoethanolamine in 95% ethyl alcohol and washed with hot water until neutral to litmus.

The pulp was again chlorinated and washed as before but this time it was extracted with a hot 1% solution of sodium sulphite in 60% ethyl alcohol and again thoroughly washed with hot water. This treatment was repeated to remove the last traces of lignin.

All four batches of holocellulose pulp were combined and thoroughly mixed for the determination of yield, physical properties, and chemical composition according to standard methods. (Table III.)

The holocellulose, having a permanganate number of 1.5 was bleached in two stages to prevent its degradation. The bleaching was done at approximately 2% consistency in a glass-lined tank provided with a motor-driven stainless steel agitator. In the first stage of bleaching, 0.6% of calcium hypochlorite solution, equivalent to 0.21% of chlorine on the moisture-free weight of pulp charged, was added. Although the bleaching agent was not entirely exhausted, the pulp was removed from the bleacher and washed after the reaction had continued for approximately 30 minutes. In the second stage of bleaching, 0.5% of bleaching powder or 0.18% of chlorine was added and the pulp treated as before. The washed, bleached holocellulose was then chemically analyzed and subjected to the same physical tests as the unbleached product. (Table III.)

Treatment of the Holocellulose

Owing to the rapid hydrating properties imparted by the hemicelluloses retained in the holocellulose, certain portions of the hemicelluloses must be removed in order to obtain a pulp suitable for the higher grades of paper. Various portions of the hemicelluloses were, therefore, extracted, first from 10-gram batches of the holocellulose for chemical analysis and later from 1.5-pound batches for strength properties as well by digesting at various temperatures with caustic soda solutions of several concentrations.

For the extraction treatments, samples of bleached holocellulose were digested for 2 hours with 2, 3, 4, and 10% solutions of caustic soda. The moisture content of the holocellulose was included in calculating the concentration of the caustic soda solutions, e.g., the ratio of caustic soda to moisture-free holocellulose was 0.3 for the 2% extraction and 1.5 for the extractions with 10% caustic. The temperatures employed were varied from 25 to 95° C. For the 1.5-pound extractions at elevated temperatures, the pulps were treated in a steam-jacketed, glass-lined kettle equipped with a mechanical stirrer. The extraction at room temperature was done in a 10-gallon earthenware jar without stirring so as to minimize oxidation of the pulp. Strength tests and chemical analyses were made on the pulps by standard methods. The data obtained are reported in Table III.

Results and Discussion

Yield and Chemical Composition

According to the data in Table II and III, the yield of moisture-free softened chips resulting from the first stage of delignification by the neutral sulphite semichemical process averaged 77.2% for the two digestions; about one-half of the lignin present in the original wood was removed and 4.1% of the cellulose (Cross and Bevan) was solubilized by this treatment. The loss in pentosans (0.16%) was much less in proportion to the cellulose removal. Indicative of the mild action of neutral sulphite liquors was the apparent gain (2.15%) in the alpha cellulose content of the Cross and Bevan cellulose obtained from the neutral sulphite semichemical pulps in comparison with that from the original wood.

Purification of the semichemical pulp by the holocellulose method resulted in a yield of 57.2% of a lignin-free product containing 100% cellulose (Cross and Bevan) and 49.8% alpha-cellulose. As a result of the holocellulose treatment, the alpha-cellulose content showed a further increase of 3.2% over that obtained from the Cross and Bevan cellulose prepared from the semichemical pulp. Thus, nearly 50% of the moisture-free weight of the wood was recovered as alpha-cellulose. The cuprammonium viscosity of the unbleached holocellulose fraction was 43.5 centi-

* Since the neutral sulphite semichemical pulps were refined by the holocellulose method, pulps so prepared will be referred to hereafter as holocellulose.

poises which, together with the high yield of alpha-cellulose, indicated but little degradation. The pentosan content of the unbleached "holocellulose" showed a 1.85% decrease in comparison with that of the original wood. Most of this loss (1.7%) resulted from purification by the holocellulose method rather than as a result of cooking with neutral sodium liquors.

Bleaching the holocellulose with 1.1% (0.39% chlorine) of standard bleaching powder resulted in no measurable loss in yield or viscosity of the holocellulose, in 0.3% loss in alpha-cellulose, and in less than 0.2% loss in pentosans.

Extraction of portions of the hemicellulose from the bleached holocellulose with caustic soda solutions for various periods at several temperatures reduced the yield from 57.2% to 47.3%, depending upon the concentration and temperature of extraction. By this treatment the alpha-cellulose in the pulps was increased from 86.7% in the bleached holocellulose up to 95.4% in one of the extracted pulps. Based on the original wood, losses in alpha-cellulose were from 3.1 to 7.1%, depending upon the degree of treatment.

The degree of degradation is also indicated by the cuprammonium viscosity of the alkali extracted pulps. Viscosity values for the 10-gram experimental extractions were quite uniform for the different degrees of treatment and approximately the same as that of the bleached holocellulose, indicating no degradation of the extracted pulps. On the other hand, the viscosity values of the pulps resulting from the larger-scale extractions (1.5 pounds of pulp) were considerably decreased, especially in the cases where the pulps were stirred during extraction, at the higher temperatures. Oxidation of the cellulose may have resulted from such a drastic treatment, as the 1.5-pound batch treated at room temperature with 10% sodium hydroxide solution without stirring showed much less evidence of degradation.

The concentration of caustic soda in the extraction liquors had considerable effect on the pentosan content of the extracted pulps. Low concentrations of caustic soda decreased the pentosan content only slightly, whereas the higher concentrations (10%) reduced the pentosan content of the pulps from 6.6% in the bleached holocellulose to 1.6% in the alakali extracted holocellulose.

The concentration of sodium hydroxide used for extraction of the hemicelluloses had more effect on the yield of pulp than did the temperature of extraction. Where the temperature of extraction was the same, an increase in concentration of caustic soda decreased the yield appreciably, whereas the decrease in yield with increase in temperature of treatment was markedly less when the concentration was the same

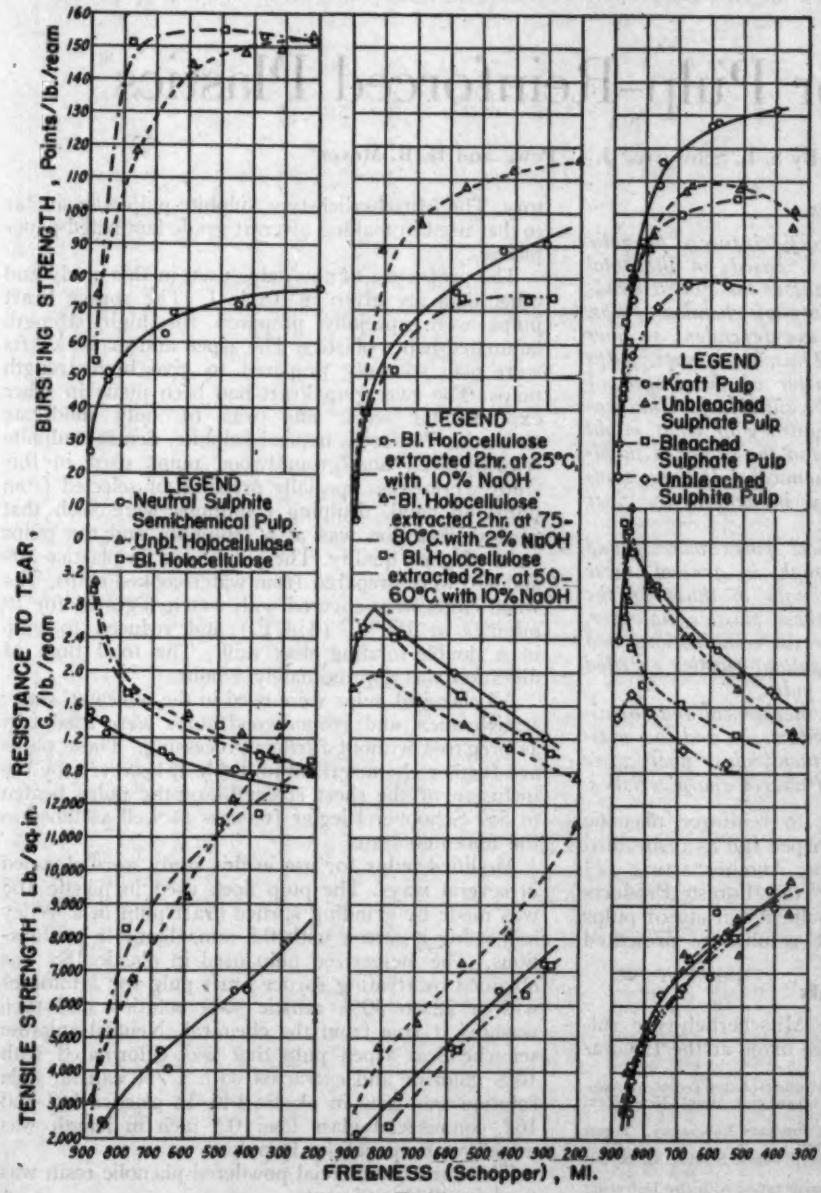

FIG. 2

Comparison of Certain Strength Properties of Douglas Fir "Holocellulose" Pulps with Those of Douglas Fir Sulphate and Sulphite Pulps.

COLOR OF PULPS

Purification of the semichemical pulps by the "holocellulose" method increased the color of the pulps from 25 Ives parts blue to 60. The chlorine requirement of the holocellulose was approximately 0.35%, whereas that for the Douglas fir bleachable sulphate pulp was 8.75%.

Upon bleaching the holocellulose with 1.1% of calcium hypochlorite, an Ives blue reading of 79 was obtained. Extraction of the bleached holocellulose with a 2% caustic soda solution

for 2 hours at approximately 75° C. decreased this value to 71 parts (Ives blue reading). Of special interest, however, are the results obtained from the removal of the hemicelluloses by extraction with 10% caustic soda solution. The color of one of the extracted pulps was increased from a whiteness of 79 parts (Ives blue reading) to 85 and that of the other in a whiteness of 83.

Physical Properties

Except for folding endurance, the strength properties of the Douglas fir holocellulose prepared from neutral sulphite semichemical pulps were equal or superior to spruce holocellulose (*2*) made from Asplund fiberized wood. (Table III, and Fig. 2.) They were much stronger than the semichemical pulps from which they were made, and in certain respects they were superior to sulphate and sulphite pulps made from the same batch of wood. Mild bleaching treatment did not materially decrease the strength properties of the holocellulose.

Removal of the hemicelluloses by extraction of the bleached holocellulose with caustic soda solutions greatly retarded both the rate of hydration as measured by Schopper freeness and strength development. This treatment resulted in decreasing the bursting and tensile strength and in materially increasing the tearing strength of the bleached holocellulose pulp. Upon removal of the hemicellulose and consequent increase in alpha content of the pulps by alkali extraction, the bulkiness of the pulps also increased.

Thus it is possible to produce white pulps of high yield and strength from Douglas fir, and to control their physical and chemical properties.

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Pulps for Pulp-Reinforced Plastics*

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Abstract

Strong, tough, resin-filled, pulp-reinforced phenolic plastics containing 40% resin, based on the total moisture-free weight, were made at the Forest Products Laboratory from a variety of chemical pulps. The strength properties were not dependent on fiber length or pulp-sheet strength. Thus, black maple pulps whose fibers are only a quarter of the length of spruce fibers, were found to be suitable for the production of strong plastics. Contrary to what might be expected, the plastic flow and the required molding pressure of the various chemical pulp-resin combinations were not markedly influenced by fiber length.

Mechanical and semichemical pulps were found suitable for pulp plastics though, in general, these plastics were inferior in strength to those of the chemical pulps. In most of these plastics, however, the plastic flow of the pulp-resin combinations and the water resistance of the resultant plastics excelled those obtained with chemical pulps.

Modification of the pulp by mechanical and chemical treatment prior to filling with resin, and the addition of a noncellulosic constituent, glass fiber, were used to secure pulp plastics of altered characteristics.

Wood pulp is being used to reinforce phenolic plastics, both in the form of paper and as resin-filled or impregnated pulp preforms. Another article *(1)* describes previous work by the Forest Products Laboratory with resin-filled pulp. A variety of pulps have now been tried and the results are presented here.

Materials

With the exception of the Mitscherlich-type sulphite pulp, all pulps used were made at the Laboratory. The Mitscherlich-type sulphite pulp was similar to that used in making aircraft grade laminated-paper plastics.

The properties of the pulps used in this study and other data are given in Table I. The spruce kraft pulps were specially prepared for high-strength laminated-paper plastics. The aspen and maple krafts were also specially prepared to give high-strength pulps. The sweetgum kraft had been made in other experimental work and was of only moderate strength. The soda, neutral sulphite, neutral sulphite semichemical, and groundwood pulps used in this study were either specially prepared or selected from pulps on hand. Pulping conditions were such that fiber degradation was at a minimum and the pulps were of good quality. The pulps used in plastics 209 and 210 were prepared from water-cooked chips. The wood chips were covered with water, digested for 10 minutes at 180°C. (354°F.) and reduced to pulp in a double-rotating disk mill. The total time of digestion was approximately 1 hour.

All chemical pulps were used in the unbeaten state; semichemical and groundwood pulps were used just as prepared without further processing. These pulps are further characterized in Table I, however, by the inclusion of the sheet strengths of the pulps beaten to 550 Schopper-Riegler freeness as well as those in the unbeaten state.

Modified pulps for use in this study were obtained in several ways. The pulp flock used in plastic 165 was made by grinding spruce kraft pulp in a Wiley mill using a screen with 0.5 mm. diameter perforations. The mercerized pulp used in plastic 188 was obtained by treating spruce kraft pulp for 3 minutes with a 28 to 30% caustic soda solution and then washing it free from the chemical. Neutral sulphite semichemical aspen pulp that was chlorinated with 16% chlorine and extracted with a 7% caustic soda solution was used in plastic 146. In plastics 163 and 164, commercial glass fiber 0.5 inch in length was mixed with spruce kraft pulp.

The same commercial powdered phenolic resin was used in all experiments.

* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Commodore Hotel, New York, N. Y., February 19-22, 1945.
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[3] Maintained at Madison 5, Wis., in cooperation with the University of Wisconsin.

TABLE I.—CERTAIN PROPERTIES OF PULP-REINFORCED PHENOLIC-RESIN PLASTICS MADE FROM A VARIETY OF PULPS

Plastic No.	No. of Panels[2] Tested	Type	Pulp Properties[1]: Freeness (Schopper-Riegler), ml.	Yield based on moisture-free wood, %	Bursting Strength: Unbeaten, Points/lb./ream	Bursting Strength: At 550 freeness, Points/lb./ream	Tearing Strength: Unbeaten, Grains/lb./ream	Tearing Strength: At 550 freeness, Grams/lb./ream	Tensile Strength: Unbeaten, Lb. per sq. in.	Tensile Strength: At 550 freeness, Lb. per sq. in.	Density: Unbeaten, Grams per ml.	Density: At 550 freeness, Grams per ml.	Cellulose Content: Total, %	Cellulose Content: Alpha, %	Lignin content, %	Total pentosan content, %	Plastic Properties[2]: Resin content,[3] %	Molding pressure, Lb. per sq. in.	Plastic flow[4] (diameter increase) In. per 1,000 lb. per sq. in.	Water[5] absorption in 24 hr., %	Specific gravity	F.P.L.[7] toughness, Flatwise ½-inch thickness, In. lb./in. width	Tension: Ultimate strength, Lb./sq. in.	Tension: Proportional limit stress, Lb. per sq. in.	Tension: Modulus of elasticity, 1,000 lb. per sq. in.	Tension: Elongation,[8] %	Edgewise Compression: Ultimate strength, Lb./sq. in.	Edgewise Compression: Proportional limit stress, Lb. per sq. in.	Edgewise Compression: Modulus of elasticity, 1,000 lb. per sq. in.	Edgewise Compression: Yield point strength 0.2% offset, Lb. per sq. in.
		BLACK SPRUCE PULPS																												
53	2	Kraft	866	51	0.78	1.76	3.65	1.46	4,080	12,500	0.49	0.82	93	75	4.6	9.8	40	3,000	0.10	2.4	1.40	24	24,000	6,300	1,900	1.9	16,300	2,500	1,600	6,200
134	1	Kraft	845	47	0.57	1.76	3.20	1.53	2,690	12,500	0.51	0.83	93	75	3.8	9.7	40	2,750	0.11	1.9	1.38	19	25,100	4,600	2,000	1.9	14,900	2,300	1,900	7,400
165	2	Kraft, ground to flock form[9]	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	43	625	0.20	1.8	1.37	14	12,700	4,000	1,100	2.2	15,600	1,700	1,100	4,800
163	2	Kraft, with 20% glass fiber[9]	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	41	2,750	0.10	1.6	1.43	19	22,900	6,200	2,000	1.7	18,500	.....	.....	.....
164	2	Kraft, with 50% glass fiber[9]	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	43	2,000	0.17	1.2	1.52	11	15,300	4,400	1,600	1.4	20,900	.....	.....	.....
188	3	Kraft, mercerized with caustic soda[9]	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	33	2,400	0.12	1.9	1.40	25	18,200	4,200	1,200	3.3	20,600	2,600	1,200	6,200
135	1	Sulphite, Mitscherlich type	850	..	0.69	1.00	1.57	0.80	4,200	10,800	0.60	0.90	93	79	0.9	5.6	40	2,750	0.16	2.2	1.41	13	20,600	4,600	1,800	1.7	14,000	2,000	1,800	6,400
145	3	Sulphite, semichemical	890	75	0.22	0.84	1.13	0.65	660	5,600	0.30	0.57	69	55	20.8	7.6	41	1,000	0.31	2.0	1.35	10	17,400	6,100	1,500	1.5	17,500	2,200	1,300	6,100
161	2	Neutral sulphite	865	39	1.03	1.92	2.67	1.43	4,090	11,900	0.49	0.81	94	78	2.6	9.5	40	2,250	0.13	2.1	1.40	21	22,900	6,700	1,700	2.0	17,000	2,500	1,600	6,200
209	1	Water cook	498	85	0.40	...	1.34	...	2,230	.....	0.47	...	61	49	31.1	7.7	39	2,000	0.25	1.2	1.36	10	14,500	6,000	1,400	1.3	18,100	3,000	1,300	7,600
86	4	Groundwood[10]	460	94	0.25	...	0.71	...	1,420	.....	0.39	...	60	43	28.0	12.3	40	1,300	0.25	1.5	1.35	7	15,500	5,800	1,400	1.4	17,100	2,700	1,300	7,500
		ASPEN PULPS																												
208	3	Kraft	825	..	0.55	1.25	0.98	0.88	3,950	12,000	0.60	0.90	97	81	0.9	...	41	2,500	0.15	1.8	1.40	28	23,400	4,700	1,700	2.4	17,900	2,200	1,600	7,600
192	3	Neutral sulphite	815	46	0.50	1.17	0.94	1.00	2,960	11,100	0.54	0.83	94	78	2.1	15.2	42	2,250	0.18	1.8	1.38	27	24,000	4,800	1,800	2.1	14,000	2,600	1,600	6,200
150	3	Neutral sulphite, semichemical	590	75	0.68	0.70	1.00	1.07	5,240	5,600	0.65	0.67	80	62	12.0	18.8	41	1,500	0.23	1.8	1.37	15	19,100	5,300	1,500	2.3	18,400	2,000	1,300	5,900
146	3	Neutral sulphite, chlorinated and caustic extracted	...	58	...	...	...	...	.....	.....	...	...	98	79	0.5	19.7	39	1,000	0.13	2.3	1.37	21	16,300	4,700	1,300	2.6	16,000	3,000	1,200	5,800
204	3	Soda	810	50	0.35	0.91	0.86	0.87	2,440	9,200	0.54	0.87	96	85	1.3	16.4	41	2,500	0.13	1.6	1.39	21	22,200	3,900	1,700	2.3	16,300	2,200	1,500	6,600
210	3	Water cook	597	80	0.28	...	0.61	...	1,760	.....	0.55	...	72	60	20.1	9.4	39	2,000	0.41	1.2	1.36	12	17,200	4,200	1,500	1.8	17,300	2,400	1,300	6,400
144	3	Groundwood	482	94	0.19	...	0.48	...	920	.....	0.38	...	67	51	20.9	17.9	40	1,000	0.19	1.6	1.34	9	15,800	5,600	1,300	1.6	17,300	2,300	1,100	6,600
		SWEETGUM PULPS																												
193	3	Kraft	865	51	0.31	0.89	0.96	0.87	1,480	8,200	0.48	0.82	..	..	...	...	40	3,000	0.10	1.9	1.39	19	17,700	4,100	1,500	1.9	16,500	2,200	1,400	5,700
149	3	Neutral sulphite, semichemical[11]	895	81	0.10	0.50	0.60	1.00	130	3,300	0.24	0.55	70	55	19.7	17.7	40	1,500	0.24	1.9	1.36	12	17,500	6,200	1,400	1.8	18,600	1,600	1,300	5,600
		BLACK MAPLE PULPS																												
205	3	Kraft	825	..	0.42	1.28	0.70	1.07	2,850	9,800	0.54	0.80	96	81	1.4	19.8	41	2,500	0.10	1.7	1.38	20	19,900	3,800	1,500	2.7	17,200	2,300	1,300	6,000
191	3	Neutral sulphite	840	54	0.40	1.16	0.79	1.08	1,970	8,600	0.48	0.77	93	76	3.5	16.0	42	2,000	0.16	1.8	1.38	22	20,900	4,200	1,500	2.2	15,800	2,700	1,300	6,000
		YELLOW BIRCH PULP																												
83	2	Neutral sulphite	880	45	0.24	1.28	0.95	1.00	950	10,400	0.43	0.81	95	76	3.0	19.7	39	3,000	0.11	1.8	1.40	22	23,700	8,700	1,700	2.1	16,500	2,800	1,700	6,900
		COMMERCIAL PHENOLIC PLASTICS[12]																												
		Wood-flour filled	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	50	.....	...	0.6	1.34	2	7,100	5,500	1,000	..	24,100	3,300	1,000	....
		Sisal filled	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	40	.....	...	3.4	1.33	20	10,400	....	1,100	..	12,600	....	1,100	....
		Chopped-tire-cord filled	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	50	.....	...	1.6	1.34	15	4,600	2,700	1,100	..	22,000	2,600	900	....
		Aircraft-grade paper-plastic (cross-laminated)	...	..	...	...	...	...	.....	.....	...	...	..	..	...	...	35	.....	...	2.4	1.40	19	27,200	9,800	2,700	..	20,800	5,400	2,300	....

[1] Tests made according to Forest Products Laboratory standard testing methods for pulpwood, pulp, stuff, and paper.

[2] Properties were determined from specimens prepared, conditioned and tested in accordance with Federal Specifications for Plastics, L-P-406, Dec. 9, 1942, unless otherwise noted. Machined edges were not otherwise finished prior to test. Compressive stress-strain properties were obtained by testing a 1- by 4-inch specimen as a laterally supported column. Ultimate compressive strength was obtained by testing specimens 1 inch wide by 0.5 inch long in pairs, 1 inch apart and parallel. Values represent the average for the indicated number of tests.

[3] Each panel furnished two tensile specimens, four compression specimens for ultimate strength determination, two compression specimens to determine elastic properties, five toughness specimens and two water-absorption specimens.

[4] Based on total moisture-free weight.

[5] This value is based on the expansion of the pulp mat during molding and is considered to be a rough measure of the flowing ability of the mixture.

[6] Specimens 2 by 2 by ⅛ inch in thickness.

[7] Forest Products Laboratory intermediate-capacity toughness machine; unnotched specimen, ¾ inch wide by nominal ⅛ inch thickness by 3.5 inches long, tested over 2.5-inch span.

[8] Elongation immediately before fracture, measured over a 2-inch gage length.

[9] Pulp-property tests were not made on these modified pulps.

[10] Groundwood was prepared from white spruce.

[11] Contained black gum in admixture with the sweetgum.

[12] Results of tests made at the Forest Products Laboratory.

Equipment and Procedure

The equipment and method of converting the resin-bearing pulp to the plastic state has been described elsewhere *(1)*. The pulp, powdered phenolic resin, and zinc stearate (1% of the mixture) were suspended in water, at about 1% consistency. A wetting agent was used to aid in dispersing the powdered material. The stuff was formed into a mat 8.5 inches in diameter in a pressure forming apparatus. The amount of resin retained (resin content) was approximately 40% of the moisture-free weight of the mixture. The wet mat was dried in a forced-circulation oven at 35° to 40°C. (95° to 104°F.) for 24 hours, conditioned at 24°C. (75°F.) and 50% relative humidity for at least 24 hours and molded between cauls at 160°C. (320°F.) for 13 minutes, using appropriate pressures determined by trial. All panels were removed from the press when still hot and allowed to cool in air at room temperature.

Testing of Plastics

Strength properties were determined on specimens taken from one to four nominal ⅛ inch thick panels of each pulp-type plastic. In general, the number and type of specimens taken from each panel were as follows: two tensile specimens, two compression specimens to determine the elastic properties, four compression specimens to determine ultimate strength, five toughness specimens, and two water absorption specimens. Tests, other than toughness, were made according to the methods outlined in "Federal Specifications for Plastics, Organic: General Specifications (Methods of tests) L-P-406, December 9, 1942." The toughness tests were made on the Forest Products Laboratory intermediate - capacity toughness - testing machine.

Results

The plastic properties and the properties of the pulps used are given in Table I. Strong and tough plastics were obtained not only with the long-fibered softwood, but with short-fibered hardwood pulps as well. Thus birch neutral sulphite pulp (plastic 83), with approximately half the fiber length of spruce, gave a plastic with strengths about equal to those of the spruce kraft pulp plastics 53 and 134. Black maple pulps, with only a quarter of the fiber length of the spruce pulps, also produced strong plastics. Contrary to what might be expected, plastic flow and the required molding pressure of the various pulp-resin combinations were not markedly influenced by the fiber length of the pulp employed. The short fibered hardwood pulps, however, may felt better and may therefore be advantageous in the making of pulp-resin preforms by the suction process.

Pulp sheet strength is not important to plastic strength. Thus, spruce neutral sulphite, plastic 161, with an unbeaten pulp bursting strength of 1.03 points per pound per ream, did not give an appreciably stronger plastic than aspen soda pulp, plastic 204, which had an initial bursting strength of only 0.35 point per pound per ream.

Mechanical and semichemical pulps were also found suitable for pulp plastics. Groundwood pulps (plastics 86 and 144) gave plastics with somewhat lower tensile strength and decidedly lower toughness than the best of the chemical pulps. Even groundwood pulp plastics, however, were still greatly superior to wood-flour-filled plastics in these properties. In addition, the high-yield pulp-resin combinations flow well during molding and the resultant plastics had somewhat better water resistance than the chemical-pulp plastics. Plastics 209 and 210 made from water-cooked wood chips had only moderate tensile strength and toughness, but they had high water resistance and, especially with aspen, the flow during molding was exceptional. The semichemical pulps tended to give plastics with somewhat low toughness values but otherwise were quite strong. The plastic flow of the spruce sulphite semichemical pulp (plastic 145) was very good. High-yield pulps, in general, present interesting possibilities and are being investigated.

Artificial shortening of spruce kraft fibers, as in the flock plastic 165, brought about a great reduction in the molding pressure required and an appreciable increase in flow as compared to that of the original pulp. Toughness and tensile strength of the plastic were reduced considerably but were still relatively high. They greatly exceeded the toughness and tensile strength of wood-flour plastics. In view of the advantages of increased moldability and improved flow, such flocks may have merit. In order to limit the loss of strength occasioned by cutting the fiber, however, the method of felting the pulp-resin mixture from water suspension as described should be used rather than milling the pulp and resin together as is customarily done in commercial practice with cotton flock. Better strengths are obtained by the aqueous method than by milling since superior fiber formation results and further mechanical disintegration of the pulp by milling is avoided.

Properties of the plastic may be altered by the addition of other substances. A mixture of 20% or 50% of glass fiber with black spruce kraft pulp, as in plastics 163 and 164, respectively, improved the ultimate compressive strength of the product, but with the 50% glass-fiber mixture the ultimate tensile strength and toughness dropped considerably. Water absorption was decreased by the substitution of glass fiber for cellulosic material.

Properties of the plastic may also be modified by chemical treatment of the pulp. Ultimate compressive strength was raised by mercerizing the kraft fiber. Thus, in spite of the low resin content that tends to lower this property, plastic 188 was among the highest in ultimate compressive strength. Mercerization tends to produce high elongation in tension at rupture. The chlorinated and caustic-extracted neutral sulphite semichemical-pulp plastic 146 and the black maple kraft plastic 205 likewise had rather high elongation.

Conclusion

It appears that strong, tough, pulp-reinforced phenolic plastics can be prepared from chemical wood pulp irrespective of the source and means of obtaining it provided the intrinsic fiber strength of the pulp is maintained. High-yield pulps, mechanical and semichemical, are suitable for pulp plastics and may prove advantageous for specific purposes. Specific properties of pulp plastics may be enhanced by modifying the pulp prior to combining with the resin or by incorporating a noncellulosic material in the pulp-resin mixture.

Literature Cited

1. Schwartz, S. L., Pew, J. C., and Meyer, H. R., Pulp-reinforced plastics, FPL Mimeo. No. R1461.

Everest Previews Future

CHICAGO, Ill., July 11, 1945—In 1900 the American paper industry produced about 2,250,000 tons; estimated annual production today is 18,000,000 to 18,500,000 tons. In 1900 there were 1232 paper machines in operation. Today there are about 1600 machines in use. These figures were presented in a "Review and Pre-View of the Paper Industry" presented to the Chicago Professional Paper Group by D. C. Everest, president and general manager of Marathon Corporation, manufacturers of pulp, paper, paperboard and convertors of packages and packaging materials.

Among outstanding developments in the review of the industry Everest pointed to the increase in kraft paperboard from less than 30,000 tons in 1926 to 1,553,000 tons in 1944 and the increase in production of all types of container and box baords from 4,555,000 tons in 1935 to 7,922,900 tons in 1944. Another impressive "before and after" figure is the production of wood pulp: 1,000,000 tons in 1900; 10,000,000 tons in 1942 plus imports of 1,200,000 tons.

"Pre-viewing" the paper industry's trends, Everest said: "I am of the opinion that we are in for the longest sustained period of prosperity ever known in this country." The speaker pointed to several obstacles which will prevent the industry from immediate attainment of the 20 to 25 million ton production estimated by some authorities. One of these bottlenecks is the production of pulpwood which Everest says is the key to the industry's expectation of post-war achievement.

Speaking of pulp imports, Everest said the American paper industry will need all the pulp it can get from overseas and will welcome imports. He predicted that Russia will show the greatest increase of any country in the world in paper and paperboard consumption per capita within the next ten year period.

Everest's estimate of domestic production of paper and paperboard for the post-war period is 17,400,000 tons. Of this quantity 17 million tons is for domestic use, 400,000 tons for export. Many improvements in "grades" of paper are in sight. Certain new processes and some new uses for paper will follow the war. There may be certain regional shifts in paper manufacturing as new pulpwood sources are developed. Everest emphasized the importance of technical work on papers and processes necessary to keep abreast of the procession of paper progress which is all set to move after the war.

Andrews Takes on Howard

BOSTON, Mass., July 9, 1945—The Andrews Paper Company has been appointed exclusive New England distributor for the Howard Paper Company, Urbana, O. Announcement of this appointment was made simultaneously by Howard Miller, sales manager of the Howard Paper Company and Fred Herbolzheimer, manager of the fine paper department of the Andrews Paper Company.

The Howard concern is one of the largest in the country, including the Howard Paper Company, Urbana, O.; Aetna Paper Company, Dayton, O.; Maxwell Paper Company, Franklin, O.; Dayton Envelope Company, Dayton, O.

Bloom Opens Agency

BOSTON, Mass., July 9, 1945—Carlton W. Bloom, who recently resigned as sales manager of Godfrey L. Cabot, Inc., is setting up his own distributing organization with headquarters in Room 605 at 77 Franklin street. Among others, Mr. Bloom will be the distributing agent for the Cabot properties of carbon black and pine tar in New England to the paper, paint, ink and rubber industries. He expects to handle also other raw materials. The name of the concern, of which he is the owner, is to be the Raw Materials Co.

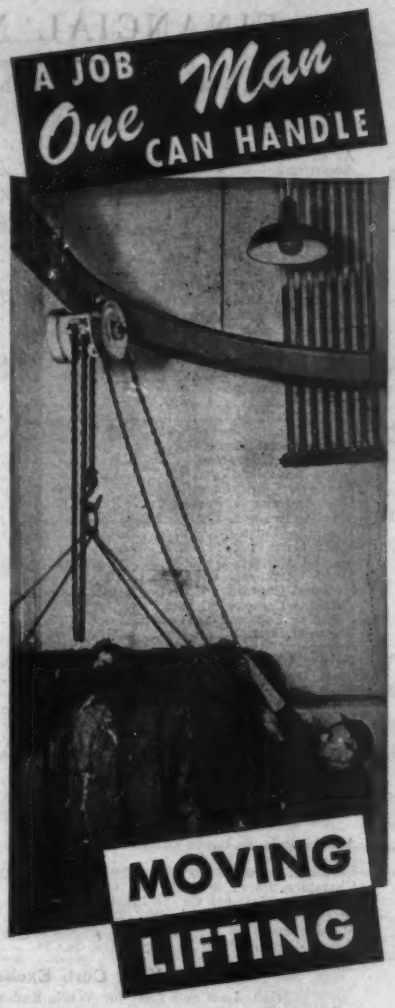
British Honor Curtis

ST. LOUIS, July 11, 1945—Francis J. Curtis, vice-president of Monsanto Chemical Company, has been elected chairman of the American Section of the Society of Chemical Industry, an English organization of industrial chemists. He assumed his duties as chairman on July 1, shortly after his return from Europe on a British-American mission to inspect German chemical plants. For the past year he had served as vice chairman of the same committee.

Faxfilm Comparator

Widespread use of Faxfilm in industry and research where it has been used for checking machined finishes, metallurgical specimens, paper and fabric structure, biological specimens, etc., has indicated the need for apparatus where two surfaces could be compared at 100 diameter magnifications by Faxfilm.

This has been provided by the Faxfilm Comparator Apparatus, Model C-1000, through Rex D. McDill, 5107 Mayfield road, Cleveland 21, Ohio. Faxfilm is the method by which an exact replica of a surface is made in clear plastic in less than a minute's time.



For moving bales, boxes, crates, drums, barrels with limited manpower, the Reading Multiple Gear Chain Hoist provides a practical solution.

Loads up to 2 tons can be lifted by one man. The load brake holds positively till released. Where I beam trolleys are used, loads can be moved with ease by one man.

Long life is insured by the sealed-in-oil gear unit—an exclusive feature. The all steel construction from hook to hook gives high overload capacity — guaranteed 25% over rated capacity.

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FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending July 7, 1945

STOCKS

	High	Low	Last
A. P. W.	7	6⅝	6⅞
Armstrong Cork Co.	46⅛	44⅜	44⅜
Celotex Corp.	16¾	16⅛	16⅛
Celotex Corp., pf.	21¾	20½	20½
Certain-Teed Products Corp.	10⅞	10⅝	10⅝
Certain-Teed Products Corp., pf.	160	158½	158½
Champion Paper & Fibre Co.	36¼	35⅛	35⅛
Champion Paper & Fibre Co., pf.	110½	110¼	110½
Congoleum Nairn Co.	29¾	29⅝	29½
Container Corp. of America	29½	28½	29
Continental-Diamond Fibre Co.	13	12⅜	12½
Crown-Zellerbach Co.	23	22½	22⅝
Crown-Zellerbach Co., pf.	104½	104	104¼
Dixie Cup Co.	27	26¼	27
Dixie Cup Co.—A.	48	48	48
Flintkote Co.	29½	28	28⅞
Flintkote Co., pf.	110	109	109
Robert Gair	6⅜	6⅜	6½
Robert Gair, pf.	18	17¾	17⅞
International Paper Co.	28⅛	26⅝	27
International Paper Co., pf.	98¼	95⅛	98¼
Johns-Manville Corp.	122½	120¾	122½
Johns-Manville Corp., pf.	....	....	....
Kimberly-Clark Corp.	46½	45½	45½
Mac Andrews & Forbes	....	....	....
Mac Andrews & Forbes, pf.	153	153	153
Masonite Corp.	44⅛	43½	43⅜
Mead Corp.	15⅜	14½	14½
Mead Corp., pf. A—6%	....	....	....
Mead Corp., pf. B—5½%	100	100	100
National Container Corp.	16⅜	15⅜	16
Paraffine Companies, Inc.	....	....	....
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	21⅜	19¾	20⅜
Rayonier, Inc., pf.	36¾	36½	36½
Ruberoid Co.	36	35½	35½
Scott Paper Co.	49¾	49¾	49¾
Scott Paper Co., pf.	112	112	112
Sutherland Paper Co.	35	34⅜	35
Union Bag & Paper Corp.	17¾	16½	17⅜
United Paperboard Co.	7¾	7½	7⅞
U. S. Gypsum Co.	92½	91½	92
U. S. Gypsum Co., pf.	191	189½	191
West Virginia Pulp & Paper Co.	30½	29½	29½
West Virginia Pulp & Paper Co., pf.	111	109	111

BONDS

Abitibi Pulp & Paper Co. 5s '53	101⅛	101⅛	101⅛
Celotex Corp. 3¾s '55	104⅜	104⅜	104⅜
Certain-Teed Products Corp. 5½s '48	....	....	....
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	....	....	....
International Paper Co. 5s '47	104⅜	104⅜	104⅜
Mead Corp. 3½s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending July 7, 1945

STOCKS

	High	Low	Last
Great Northern Paper Co.	42¼	40	40½
Hummel-Ross Fibre Corp.	9⅛	8¾	8¾
St. Regis Paper Co.	7⅜	7⅛	7⅛
St. Regis Paper Co. pf.	....	....	....
Taggart Corp.	6¾	6¾	6¾

BONDS

American Writing Paper Co. 6s '61	102	101½	102

Southern Publishers Inspect Site

Three representatives of the Southern Newspaper Publishers Association, seeking to locate a huge newsprint mill in the South, made a careful study recently in Valdosta, Ga., of several potential sites selected for them by F. H. Brown, vice president of the Georgia Southern and Florida Railway, a press report stated.

Among the sites visited was a tract of about 210,000 acres outside Valdosta near the Okefenokee Swamp owned by the Superior Pine Products Company, of which John Knight is president. Timber there belongs to Harley Langsdale, Jr., one of the world's largest naval stores producers.

The Valdostans believe that long-leaf pine, so prevalent throughout this section, could be used advantageously in the manufacture of newsprint.

The S.N.P.A. has long been interested in locating a newsprint mill in the South, and the possibilities today appear brighter than ever, it was indicated.

Champion Considers New Stock Issue

Stockholders of the Champion Paper and Fibre Company will meet in Chicago on Friday of this week—July 6—to consider a new issue of 150,000 shares of preferred stock of which it is reported 100,000 shares are to be offered in exchange for outstanding 6% preferred. If the issue is approved, according to reports, it is expected that $10,500,000 of 3¼ per cent first mortgage bonds due in 1957; $650,000 of notes due in 1946 and 1947 and 115,000 shares of 6% preferred stock will then be replaced by $13,000,000 of 20 year debentures and 100,000 new preferred shares.

Brown Co. Makes Report

The Brown Company, Berlin, N. H., and its Canadian subsidiary, Brown Corporation, manufacturers of pulp, paper, towels, conduit and other products, report unaudited consolidated net income of $821,263 after taxes and all other charges, for the 28 weeks ended June 17, 1945, as compared with $778,792 for the corresponding period of last year. For the same period, net income before taxes in 1945 was $1,982,263 as against $1,478,792 in 1944 and income taxes for the respective periods were $1,161,000 and $700,000. Working capital has increased by $452,277 to $14,198,623 in the current fiscal year.

Glatfelter Seeks Increase in Debt

PHILADELPHIA, Pa., July 9, 1945—A special meeting of the holders of preferred and common shares of the P. H. Glatfelter company, Spring Grove, has been called for August 27 at the office in Spring Grove for the purpose of voting for or against a proposed increase of indebtedness from $750,000 to $1,500,000, and for or against the issuance of bonds not exceeding the principal amount of $1,500,000 to be secured by a mortgage to the Mutual Life Insurance Company of New York to retire outstanding bonds dated July 29, 1943, and maturing August 1, 1958, as reduced in the sum of $482,000, and for the purpose of furnishing the company additional working capital and for other proper corporate purposes.

FTC Acts Against Book Paper Makers

(Continued from page 20)

such paper heretofore fixed, as found in this proceeding; or fixing or maintaining any differentials in price for any such variations.

(4) Using in the quotation and sale of book paper the geographical zones, or the price differentials between such zones heretofore fixed for pricing purposes, as found in this proceeding, or establishing or maintaining any geographical areas for pricing purposes or any differentials in price between any such areas.

(5) Preparing, distributing or using any uniform or standard form of contract which contains provisions in aid or support of any of the practices prohibited in the other paragraphs of this order.

The Commission dismissed the complaint as to Miamisburg Paper Co., Miamisburg, Ohio, as it is no longer in business. It closed the case without prejudice as to Miami Valley Coated Paper Co., Franklin, Ohio, which went into receivership; as to Stecher-Traung Lithograph Co., Rochester, N. Y., which was not found to be engaged in the sale of book paper for commercial purposes; and as to R. S. Berry, former secretary of the Association but who has not been connected with it for a number of years.

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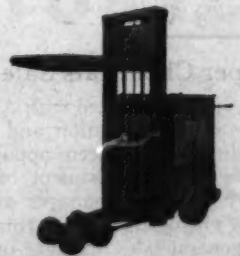
Phelps, New York

Platform size 24 x 42 x 11" high, low position; 18" high when elevated. Capacity: 2000, 3000, and 4000 pounds.

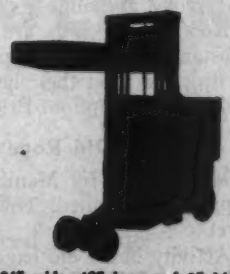
Capacity 2000 lbs. on forks 30" long. Truck turns from a 5' aisle into an intersecting aisle of 5'.

Weight of 4000 lbs. capacity—8000, without battery. Truck turns from a 5' 4" aisle into an intersecting aisle of 4'.



Platform 24" wide, 53" long and 11" high, low position. Capacity 2000, 3000 and 4000 pounds.

The Wright-Hibbard Telescoping high lift truck is designed to operate in the most congested areas of factories and warehouses. The exceptionally narrow width and short overall length found in other Wright-Hibbard trucks are retained in this model.



Platform 24" wide, 42" long and 9" high, low position. Weight of 4000 lb. capacity—3000 without battery.

New York Paper and Pulp Market Review

Government Reports Indicate Tight Newsprint and Paperboard Supply For Many Months—More Swedish Pulp Due to Arrive Soon — More Pulpwood This Year — More Waste Paper Required.

Office of the PAPER TRADE JOURNAL,
Wednesday, July 11, 1945.

Little encouragement for a substantial increase in paper and paperboard for civilian consumption can be gleaned from current government reports. The newsprint supply is tight, with some reports reflecting little expectancy of an adequate supply of print paper for United States publishers. The maintenance of a free press in European countries is an expressed reason for the continuance of a short home supply. Shortages in newsprint and in paperboard are expected by the WPB to continue until the summer of 1946.

Paper production for the week ended June 30 was estimated at 88.8%, compared with 86.2% for 1944, with 77.4% for 1943, with 67.6% for 1942, and with 72.8% for the corresponding week in 1941.

Paperboard production for the week ended June 30 was 93.0%, compared with 95.0% for 1944, with 92.0% for 1943, with 59.0% for 1942, and with 74.0% for the corresponding week in 1941.

Brightness limitation of certain grades of paper and paperboard attained by the use of chlorine, were removed by revocation of Order L-11, effective July 4, 1945. Chlorine will continue to be allocated under Conservation Order M-19.

Pulpwood

Canadian pulpwood for U. S. mills during 1945 will aggregate 1,800,000 cords, a late WPB report states. This is 550,000 more cords above the base quota of 1,250,000 cords, and 295,000 more cords than were received in 1944, or about 11% of total U. S. wood consumption.

Wood Pulp

In addition to the 2,000 tons of dissolving Swedish wood pulp recently received here, about 10,000 more tons are expected to arrive this week. Receipts by the end of this month are expected to reach 100,000 tons, and consist of unbleached sulphite and sulphate.

Rags

Mill buying of cotton cuttings continues active. Many current reports comment on the limited tonnage available. All grades of new cotton rags are in active demand at this date. Prices on whites and unbleached are strong at ceiling levels.

Roofing felt mills are reported anxious to obtain substantially larger supplies than are now available in order to meet their heavy orders for military and civilian consumption. Prices are firm at ceiling levels.

Old Rope and Bagging

Mill demand for Manila rope continues insistent, as supplies are limited. The price is firm at the ceiling level.

Activity in the old bagging market is reported only fair in many quarters for gunny. Trading in scrap bagging is relatively quiet. All prices are unchanged.

Old Waste Paper

Collections of waste paper in the metropolitan area are declining as the result of the strike of newspaper delivery workers. As only very small editions of newspapers are now being printed, the supply of folded news, mill wrappers, etc. must inevitably decrease while the labor difficulty continues.

Mill demand for paper stock continues urgent. Prices are strong at ceiling levels.

Twine

Demand for twine is reported moderate in volume this week. No important change in supply or prices has been reported at this date.

Raises Exemption For Casein

The small order exemption for casein has been raised from 6,000 to 30,000 pounds per quarter, the War Production Board reported today. This measure is intended to save paper work, WPB explained.

Formerly controlled by Order M-307 (revoked today), casein is now governed by Schedule 113 to Order M-300, the general chemicals allocation order. The shift to M-300 was made in line with the WPB policy of bringing as many allocated chemicals as possible under the control of a single order.

Lists Preferred Paper Status

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 11, 1045—Asphalting and creping paper (other than towel paper) and shipping sack paper have been given preferred production status because of critical war and essential civilian needs, by addition to the War Production Board's Direction 1 to Order M-93, amended July 4, 1945, WPB's Pulp Allocation Office announced today.

Asphalting paper, laminated with creping paper, is used in the manufacture of water-proof wrapping paper and shipping sacks for overseas shipments, WPB explained.

Third-quarter paper pulp requirements for manufacture of asphalting and creping paper (other than towel papers) are 85,000 tons, or about 12.50% over second-quarter requirements. Shipping sack paper allocations for the third quarter are earmarked at 106,280 tons, or 14% over the previous quarter's requirements, the war agency said.

Walsh Heads Paper Chemicals Sales

J. M. Walsh, for many years associated with American Cyanamid and Chemical Corporation and well known in the paper industry, has been appointed manager of the paper chemicals department of the corporation. J. D. Lowery, formerly manager of the combined heavy and paper chemicals departments has been appointed assistant general sales manager of the corporation and in addition will continue as manager of the heavy chemicals department.

"NON-USERS ARE THE LOSERS"

PROFIT PRODUCERS

TENAX FELTS

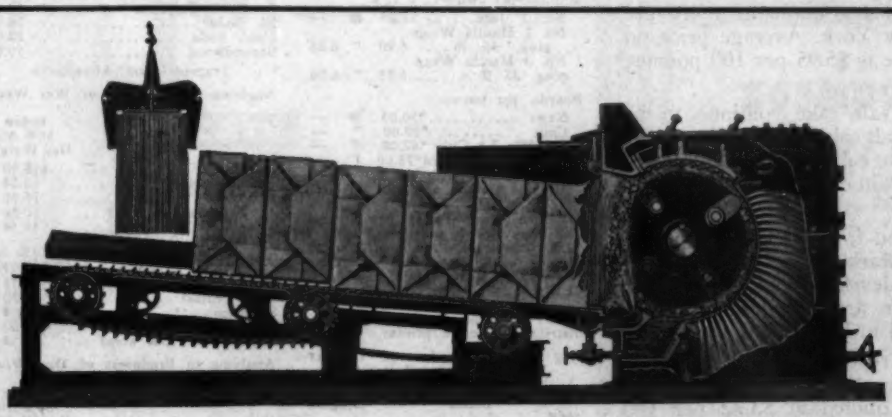
PRODUCTION PEAKS—

are still at wartime highs. Even when V-J Day comes, it will find your machines rolling at top capacity.

If you use TENAX FELTS, that day of peace will find your machines operating at peak efficiency too. You will have further proof of the ability of TENAX to provide better finish, trim and water removal, with greatest economy.

"Non-Users Are The Losers"

LOCKPORT FELT COMPANY
Newfane, N. Y. — U. S. A.



Improved
Bale Pulper
TRADE NAME

PROTECTED BY U. S. PAT. 1,910,382 AND FOREIGN PATENTS. OTHER PATENTS PENDING.

STURTEVANT BALE PULPER
for
PULPING
Bales — Rolls — Laps

Discharging at Consistencies for Pumping or Trucking any Desired Tonnage

STURTEVANT MILL CO. HARRISON SQUARE **BOSTON 22, MASS.**

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, July 11, 1945.

BLANC FIXE—Prices on blanc fixe continue unchanged at prevailing levels. Demand is reported fair. The pulp is quoted at $40 per ton, in barrels, at works. The powder is quoted at $60 per ton, f.o.b. works.

BLEACHING POWDER—All-over demand continues heavy. Production reported high. Allocation removed on February 27. Quotations are unchanged. Bleaching powder is currently quoted at from $2.50 to $3.10 per 100 pounds. All prices in drums, car lots, f.o.b. works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more 24 cents per pound; 2,000 pounds, 24½ cents per pound, less than 2,000 pounds, 24¾ cents per pound f.o.b. shipping point.

CAUSTIC SODA—Demand very heavy. Production large, but under demand. Market tight. Shipments a little delayed by lack of manpower. Solid caustic soda is currently quoted at $2.30 per 100 pounds. The flake and ground are currently quoted at $2.70 per 100 pounds. All prices in drums, car lots, f.o.b. works.

CHINA CLAY—Current demand is reported moderate on many grades of china clay. Quotations unchanged. Domestic filler clay is quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported china clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Military and all essential requirements heavy. April output lower at 103,478 tons. Chlorine is currently quoted at $1.75 per 100 pounds, in single unit tank cars, f.o.b. works.

ROSIN—Offerings and sales light. The OPA price on "G" gum rosin is $5.79 per 100 pounds in barrels, at Savannah. "FF" rosin is established quoted at $5.75 per 100 pounds, in barrels at New York. Average price on seventy per cent gum rosin size is $5.95 per 100 pounds, f.o.b. works.

SALT CAKE—Prices on salt cake continue to be reported unchanged. Domestic salt cake is currently quoted at $15 per ton, in bulk. Chrome cake is currently quoted at $16 per ton. All quoted prices in car lots, f.o.b. shipping point.

SODA ASH—Heavy demand for soda ash is reported to absorb current production. Market is tight. Prices continue to conform to prevailing levels. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Corn market is reported steady. Offerings moderate at this date. Demand continues heavy. Prices unchanged on starch. Pearl is quoted at $3.72 per 100 pounds. Powdered starch is quoted at $3.83 per 100 pounds. All prices in bags, car lots, f.o.b. Chicago.

SULPHATE OF ALUMINA—Demand good. Supply situation is favorable. Prices of the commercial grades are currently quoted at from $1.15 to $1.25 per 100 pounds. The iron free is currently quoted at $1.85 per 100 pounds. All prices in bags, car lots, f.o.b. works.

SULPHUR—Current consumption of sulphur continues heavy. Market situation unchanged. The quotation on Annual contracts continues at $16 per long ton, f.o.b. mines. The current price on contracts at Gulf Ports is $17.50 per long ton.

TALC—Demand reported good. Domestic grades are currently quoted at from $16 to $21 per ton at mines. Canadian at $24 per ton. All prices in car lots.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

Standard News, per ton—			
Roll, contract	*$61.00	@	—
Sheets	69.00	@	—
*OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, Delivered			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
*OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*$50.00	@	—
Chip	*50.00	"	—
Sgl. Mla. Ll. Chip	*62.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

*OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
100% Rag Ext.			
No. 1	$39.10 @ $46.00		$40.25 @ $47.25
100% Rag	32.20 " 37.75		33.35 " 39.25
85% Rag	.... "		29.90 " 35.00
75% Rag	23.00 " 27.00		24.15 " 28.25
65% Rag	.... "		22.80 " 27.75
50% Rag	18.70 " 22.75		19.90 " 24.25
25% Rag	16.40 " 20.00		17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
No. 1	$10.55 @ $12.75		$11.70 @ $14.25
No. 2	9.65 " 11.75		10.80 " 13.25
No. 3	9.20 " 11.25		10.35 " 12.50
No. 4	8.90 " 10.75		10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$86.00
Unbl. Softwood Sulphite	74.00
Bl. Hardwood Sulphite	83.50
Unbl. Hardwood Sulphite	71.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich @72.00	@ 82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	76.00
Unbl. Soda	72.00
Groundwood	50.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

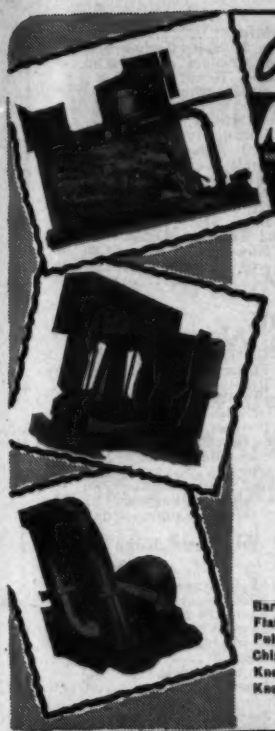
Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

*OPA Maximum Prices



Ask US ABOUT NEW MURRAY EQUIPMENT

SHOWN here are three of the latest developments to aid paper mill production, pulp stock agitator for thorough and complete agitation of pulp stock in chests, paper machine flow spreader and new fan pump for handling diluted stock going into screens. The pulp stock agitator shown is horizontal design, but this can also be made in vertical design. Complete information is yours upon request.

Also information upon any of the following equipment:

Barking drums	Wood cleaners
Flat screens	Pulp wood chippers
Pulp wood slashers	Multiple knife discs
Chip crushers	Roll heading machines
Knot saws	Windershafts
Knot drills	Unit Heaters

D. J. MURRAY MANUFACTURING CO.

WAUSAU MURCO WISCONSIN

CLINTON

STARCHES

Special Grades for Beater, Calender and Tub Sizing.

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QUALITY
UNIFORMITY
SERVICE

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CLINTON COMPANY
Clinton, Iowa

"S" SILICATE *films*

GREASEPROOF PAPER BOARD

A thin coating of "S" Silicate on chipboard or manila stock is impervious to greases and oils. "S" Brand is odorless, colorless, non-corrosive, non-poisonous and strongly repellent to vermin. Useful for sheet or roll coating operations.

"S" Silicate also serves as an undercoat for paraffin waterproof coatings. Look into this efficient and economical greaseproofing aid. Bulletin #151 giving complete details, available on request.

PHILADELPHIA QUARTZ COMPANY
DEPT. B, 121 S. THIRD ST., PHILA. 6

PQ SILICATES OF SODA

KOSMOS—DIXIE
PARIS
BLACKS

Unexcelled carbon black pigments for all types of paper and board stocks.

Outstanding for soft texture, particle fineness, and jet black color.

Best for performance in the Beater and Jordan because of ease of wetting and ready dispersion in the pulp.

Takes well to the fiber and shows high retention.

UNITED CARBON COMPANY, INC.
Charleston, West Virginia
New York Akron Chicago

Old Rags

White, No. 1—			
Repacked	*3.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Thirds and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.30	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

Pre-War Quotations

All Prices Nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.25	@	3.30
Wool Tares, light	3.25	"	3.50
Wool Tares, heavy	3.50	"	3.75
Bright Bagging	3.25	"	3.50
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Prices.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Mixed Books	1.10	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Mixed Ledger, colored	2.00	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.95	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	1.10	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—
(Hard Fiber)			
Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	—	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill)

Shirt Cuttings—	
New White No. 1	.07¼
New White No. 2	.05¾
Light Silesias	.05¾
Black Silesias, soft	.03½
New Unbleached	.07½
Washable Prints	.04¼
Washable No. 1	.03
Blue Overall	.05½
Cottons—According to grades—	
Washable Shredding	.01¾
Fancy Percales	.04½
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04¼
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1—Repacked	3.80	@	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
White No. 2—Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	@	3.50
No. 1 Clean bright—			
Sisal Strings	.04	"	—
No. 2 Clean bright—			
Sisal Strings	.03	"	—
Sisal Jute	.02½	"	.03¼
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.75	@	2.90
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*	"	4.00
Mixed Rope	—	"	1.55
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.00	"	3.25
South American	—	"	3.25

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—
Misc.	2.15	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Ledger, colored	2.00	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.40	"	—
Overissue News	1.00	"	—
No. 1 News	1.00	"	—

Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	—
Aust. Wool Pouches	—	"	3.65
New Zealand Wool Pouches	—	"	3.50
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Roofing Bagging	1.35	"	—

* OPA Maximum Prices.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¾	"	.05
New White No. 1	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¾
Underwear Cutters, Bleached	.06¼	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¾
New Black Silesias	.03	"	.03¾
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03¼	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06½
B. V. D. Cuttings	.06¼	"	.06½

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—*
Miscellaneous	3.20	"	—*
White No. 2—			
Miscellaneous	2.65	"	—*
Twos and Blues, Repacked	2.20	"	—*
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—*
Miscellaneous	1.80	"	—*
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—*
No. 2	1.45	"	—*
No. 3	1.35	"	—*
No. 4	1.35	"	—*
No. 5, Quality A	1.35	"	—*
Quality B	1.20	"	—*
Quality C	.95	"	—*
Old Manila Rope	5.75	"	—*

* OPA Maximum Prices.

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.30	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—

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We can supply Screen Vats for any flat screen and complete *UNION-WITHAM* Vat Parts for Witham Type Vats.

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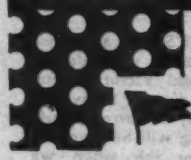
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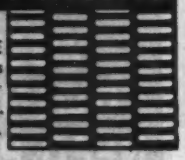

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A COMPLETE LINE
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From tissue to heavy board; narrow to wide cuts; small to large diameters—there's a size and type for every job.

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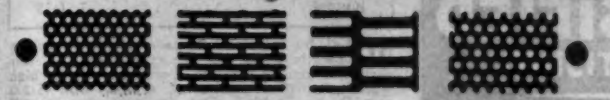

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Prepare NOW to Take Care of Increased Orders Which Will Come. Consider Necessary Repairs and Maintenance.

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Paper Bag Machines, Aniline & Oil-Ink Presses, Waxing, Gluing, Varnishing, Laminating Machines.

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"Unexpired terms in the armed services are no deterent to a post-discharge arrangement.

Address Box 45-335 care Paper Trade Journal. JL-19

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Architectural Draftsman
Familiar With Paper Mill Construction

C. R. MEYER AND SONS COMPANY
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Technically trained chemist with Paper Mill Control Experience to set up a new Control Laboratory in Groundwood Specialty Paper Mill. Good Position with a new, progressive organization. Write stating experience, age and qualifications.

GOULD PAPER COMPANY
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PAPER BAG ADJUSTER WANTED TO QUALIFY AS SUPERINTENDENT!

If you are an expert bag maker who knows how to keep machines running and can get along with your fellow workers you should investigate our offer. Don't delay! This opportunity may never come your way again.

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FOREMAN FINISHER

Must have thorough knowledge of modern finishing room equipment and practice in handling groundwood specialties.

A position with a good post war future for a man who is a good organizer and capable of working with men to produce results.

Write fully of experience and qualification—W.M.C. rules apply.

Write Box No. 45-394 care Paper Trade Journal. J-12

SUPERINTENDENT for finishing department in large modern midwestern paper converting plant. Must be expert in laminating and coating of paper, plating, stack and friction calendering, and have a good chemistry background in paper and related materials. Knowledge of water-proofing of paper and application of lacquer and plastic coatings necessary. Address Box 45-210 care Paper Trade Journal. TF

WANTED—CHIEF CHEMIST for pulp and paper mill located on Pacific Coast. Apply in own handwriting giving references, experience and other pertinent information. Address Box 45-243 care Paper Trade Journal. TF

WANTED—A recent college graduate in paper chemistry to work in our laboratory on paper coating compounds and heat sealing compounds. Address Box 45-397 care Paper Trade Journal. A-16

HELP WANTED

WANTED
PLANT MANAGER
FOLDING CARTONS

This unusual opportunity is offered by one of the country's most progressive manufacturers. It is a position of extreme responsibility, and requires unusual experience and ability. Compensation is unusually high and includes profit participation. In reply, give complete educational background, previous positions and present age.

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Specializing in Paper Mill Personnel
Positions Now Open

General Superintendent paper bag making operations
Salesman for Middle West to handle groundwood hanging papers
Directors and assistant directors industrial relations
Personnel and Employment Managers
Board Mill Manager
Mechanical Engineers $5,000-$7,000 year
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Tour Boss (Several)
Chemists, chief chemists, chemical engineers and laboratory men
Accountant (New York State) also office manager (Southern mill)
Beater engineers, machine and back tenders, machinists
And many others

We invite correspondence (strictly confidential) with employers seeking personnel and men seeking new positions. J-12

WANTED

A New Jersey Manufacturer of Machinery for the paper and textile trade desires experienced machine designers and draftsmen for post-war work. Please furnish detailed information regarding education, experience, age, marital status, and recent photograph.

Address Box No. 45-407 care Paper Trade Journal. J-19

MACHINE TENDER for cylinder machine operations. Must be experienced at this particular kind of machine operations. Prefer high school graduate or equivalent. Address Box 45-293 care Paper Trade Journal. TF

HELP WANTED for New England Book and Specialty Mill—Fourdrinier Machines:—6 Backtenders, 6 Thirdhands. Address Box 45-352 care Paper Trade Journal. J-19

SALARIED POSITIONS — This advertising service of 35 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details. R. W. BIXBY, INC., 317 Delward Bldg., Buffalo, 2, N. Y. tf

SALESMAN for large folding carton and specialty manufacturer. Unusual opportunities. Give full qualifications, age and draft status. Replies held in strictest confidence. EMPIRE BOX CORPORATION, GARFIELD, N. J. A-2

WANTED—Machine Tender, Master Mechanic, Beater Engineer. Middle aged men preferred. Small .009 straw mill, slow running machines. Keuka Paper Corp., Penn Yan, N. Y. J-12

MACHINE ERECTOR & DEMONSTRATOR —preferably with experience in paper mill or paper converting machinery such as waxing, corrugating printing, roll winding, slitting, etc.; must have thorough all around machinist experience. Good post-war opportunity. State age, experience, salary expected. Address Box 45-375 care Paper Trade Journal. TF

WANTED—Experienced Adjuster and Machine Tender for Lockport and National Paper Bag Machines, for flat and square bags. Plant in western New York. Address Box 45-385 care Paper Trade Journal. J-19

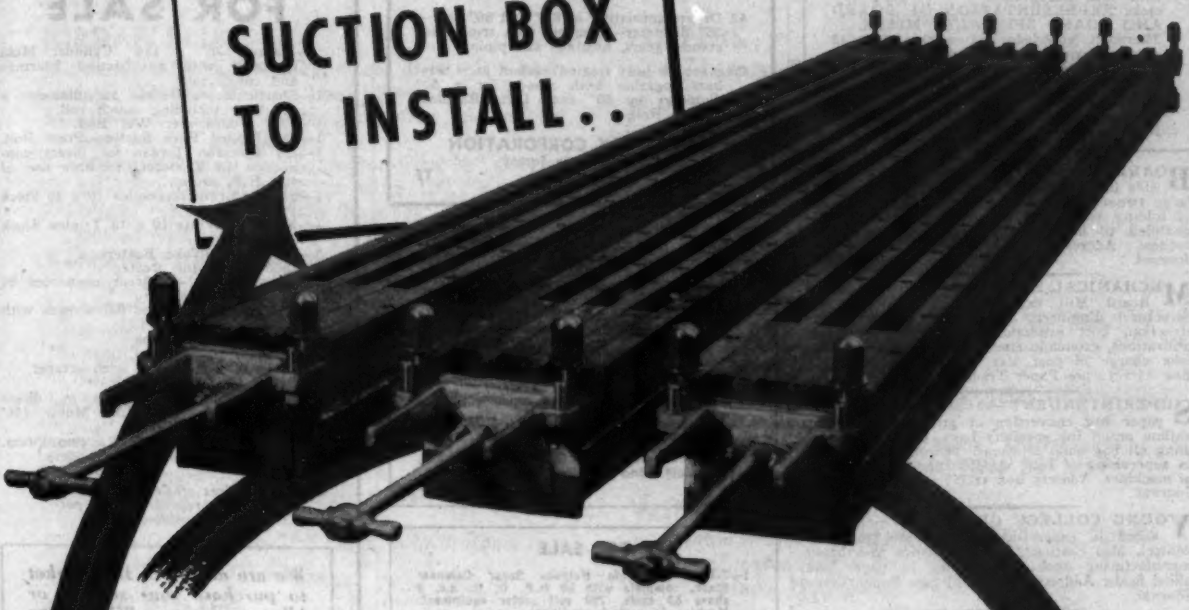
MECHANIC-MACHINIST—Steady position in two machine tissue mill and converting plant, in the East. Address Box 45-393 care Paper Trade Journal. J-12

ENGINEER with 6 to 10 years experience in the paper industry for sales, design, erection and operating work in connection with concern building pulp and paper mills abroad. Will probably involve project residence various places abroad portion of time, balance in New York City. Expenses while abroad. First letter must state age, experience, education, draft status, salary expected. Send photo, if available. Give references in paper industry especially equipment firms. Address Box 45-395 care Paper Trade Journal. A-2

WANTED—We need a graduate chemist in our expanding product development laboratory who has a background of paper chemistry and is familiar with all types and kinds of paper coatings including resins and lacquers. Address Box 45-398 care Paper Trade Journal. A-16

THE

SUCTION BOX TO INSTALL..



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1. Faster Wire Changing because — lighter in weight.
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3. Truer surface — due to unusual truss construction.

Here is a "box" that can be installed on your present Fourdrinier, singly or in multiple units—and with little alteration, regardless of type Fourdrinier you are using. There are a great many B-C suction boxes of this type in operation and their success warrants your investigation. Have us explain further and quote for your present Fourdrinier.

THE BLACK-CLAWSON Co., Hamilton, Ohio

Shartle Bros. Dilts

Divisions: Shartle Bros. Machine Co., Middletown, Ohio; Dilts Machine Works, Fulton, N. Y.

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BOARD AND PAPER SALESMAN
with Mill background
seeks REPRESENTATION OF BOARD AND BOARD SPECIALTY MILLS.
Thorough knowledge of market and 12 years of experience in production, estimating and application of products.
Presently with leading concern, but change of set up desired.
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BOARD MILL SUPERINTENDENT—Available immediately; 15 years experience in two large two-machine mills manufacturing all grades of folding board and test liners; age 44; fully qualified to handle help; full particulars upon request. Address Box 45-366 care Paper Trade Journal. J1-12

MECHANICAL ENGINEER—Paper, Pulp and Board Mill experience. Professional and Structural Engineer. Experienced design, construction, cost estimator, heat balances, steam utilizations, economic studies, process works. Can take charge of post war development. Address Box 45-371 care Paper Trade Journal. J-12

SUPERINTENDENT—20 years experience in paper bag conversion of grocery, sacks and aniline or oil ink specialty bags. Capable of handling all bag shop problems. Thorough experience in supervision of help, maintenance and repairing of machines. Address Box 45-355 care Paper Trade Journal. A-2

YOUNG COLLEGE GRADUATE — Experienced in supervision, quality and technical control, also coatings, resins, plastics and board manufacturing—seeks opportunity in paper and allied fields. Address Box 45-381 care Paper Trade Journal. TF

TOUR BOSS—25 years experience on cylinder machines on all grades of paper. Age 38. Steady. Address Box 45-382 care Paper Trade Journal. J-19

COATING AND FINISHING SUPERINTENDENT—Thorough experience in coating and finishing of all types cardboards. Now employed, wishes change. Address Box 45-384 care Paper Trade Journal. J-26

SALES AND SALES SERVICE—37. Dyes, wires, press rolls, starch, chemicals, etc., wanted by technical graduate, American. 15 years paper technologist. 6 years paper mill superintendent. Address Box 45-387 care Paper Trade Journal. J-12

AMBITIOUS MAN—40. College background. Experienced all phases fine and coarse paper, also twine. Will sell or accept responsible position with manufacturer, sales agency or distributor anywhere in U. S. A. Address Box 45-390 care Paper Trade Journal. J-26

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GENERAL SUPERINTENDENT — Wishes change. 25 years experience on free sheets, ground wood specialties, news and Kraft. Fourdrinier and cylinder machines. Age 43. Go anywhere. Prefer Canada. Would take position colorist or personnel manager in large mill. Address Box 45-402 care Paper Trade Journal. A-2

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FOR SALE—Langston Spiral Tube Winder Glue Pots, etc. 45" Langston Slitter Drum Rewind—Kidder 45" Slitter Drum Rewind—Knowlton 69" Slitter Double Shaft Rewind. Tube Cutters, etc., etc. Almost new Langston Heavy-Duty Double Belt Spiral Winder and Cut Off Saw. Theo. Adams, 111 W. Washington St., Chicago 2, Ill. J-12

FOR SALE

FOR SALE

42 Dryers consisting of 85" and 86" face—38" diameter—complete with triple deck stands, gears, bearings and piping.

One set 70 heat treated carbon steel Flybars together with woods for a 62" diameter by 50" face Dilts Bandless Beater Roll.

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Garfield, New Jersey
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34" Inman Slitter.
42" Finishing Cloth Slitter.
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44" Seybold Holyoke Aut. mill type Power Cutter.
48" White Automatic Power Cutter.
88" Finley Shooter.
116" Hamblet heavy duty Shooter.
68" Rice Barton & Fales Slitter & Rewinder, for use on dry end of paper machines.
120" Moore & White 4-drum Rewinder.
New 62" Two-Roll Back Stand, handling rolls up to 30" diameter.
4 Waldron 36" Paper Reelers
Baling Machines, both hand and power.

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1—7-Roll 48" wide Holyoke Super Calender Stack, complete with 50 H.P. G. E. s.c. 3 phase 60 cycle, 220 volt motor equipment. Machine in perfect condition.
1—42" Heavy Type Hudson Sharp two-shaft Center Wind Slitter and Rewinder. Very suitable for board work.
1—60" Universal Type No. 6 Cameron Slitter and Rewinder. Complete and in A-1 condition.
1—Complete Pulp Drying Machine with 60 Dryers 48" x 140".
1—48" Kidder Shear Cut Model S.L. Slitter and Rewinder.
1—Noble & Wood Pony Jordan. Good condition.
1—36" Camachine 44W Low Model Roll Rewinder. Complete and in good condition.
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2—Toilet Paper Perforators for 81" wide rolls, one Dietz and one Hudson Sharp.
1—116" Double-Drum Waldron into type sheer cut hydraulic Slitter and Rewinder.
4—1500-lb. Thorsen Hery Beaters equipped with 150 H/P A.C. motors and speed reducers.

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TF

REVAMPING AND BUILDING MILL AND CAN OFFER FOR SALE

One large Breaker Beater complete
One small Beater Complete
1—30" Diameter X 90" Face cylinder mold
1—8x8 Shartle Duplex plunger stock pump
1—New pair cast steel double suspension spring type beater bearings for 9" diameter journal—Noble & Wood beater roll. Never used.
1—Used old style lighter beam for 8" diameter journal Noble & Wood beater
1—New reinforced design lighter beam for 8" diameter journal—Noble & Wood beater roll. Pattern No. 683. Never used.
3—200 KVA —33000-2300/4000 volts transformers
1—250 H.P. slip ring motors & controls—450 R.P.M.—3 bearing base and pulley
60—92" Face steel dryer felt rolls—1—7/16" journals
1—20" Face cast iron taper pulley—2 15/16" bore taper 31"x29½"
4—30" diameter x 83" face dryers
1—6" to 10" Cox & Sons Pipe threading machine
1—48"x48" Noble & Wood beater roll with filling installed
1—48" Noble & Wood impeller for circulation stock in beater.
A visit to the mill would prove profitable as we have many items for sale to numerous to mention. See our superintendent Mr. O. P. Fussell at our plant in Walloomsac, New York.

WALLOOMSAC PAPER MILLS, INC.
Mills: Walloomsac, New York
Main Office: 25 Vanderbilt Avenue
New York 17, New York
TF

FOR SALE—50" Seybold Automatic Clamp Cutter, thoroughly rebuilt and fully guaranteed. Address Box 45-405 care Paper Trade Journal. J-12

FOR SALE

FOR SALE

1—Saveall 36" x 136" Cylinder Mold equipped with anti-friction bearings and couch roll.
1—Shartle Bros. Decker 36" diameter x 60" face including couch roll.
1—120" Fourdrinier Wet End.
1—68" Drilled Face Suction Press Roll.
1—#9 Emerson Jordan for direct connection to a motor, requires use of 400 H.P. motor.
1—Shartle Brothers Duplex 10 x 20 Stock Pump.
1—Moore & White 10 x 12 Triplex Stock Pump.
2—2000 lb. Holyoke Beaters.
1—1000 lb. Dayton Beater.
1—Jones pulper — direct connected to 60 H.P. motor.
2—12 Plate Packer type flat screens with steel vats.
2—6 Plate Flat Screens.
1—12 Plate Flat Screen.
1—18 Plate Flat Screen with scraper.
13—Driers 60" x 154".
1—Buffalo Pump—5500 g. p. m., direct connected to 100 H.P. Motor (50' head).
1—#4 Roots-Connersville Vacuum Pump.
2—65" Cameron tension for winders.

Various sizes of Centrifugal Pumps. Write us regarding your particular requirements.

We are always in the market to purchase your surplus or idle machinery. What have you to offer?

J. J. ROSS COMPANY
250 Frelinghuysen Ave.
Newark 5, N. J.
Bigelow 3-3720 J-12

FOR SALE

1—60 H.P. Fairbanks Morse Diesel Engine, connected to a 40 KVA Generator.

1—100 H.P. Ames Steam Engine, connected to a 75 K.W. Westinghouse Generator.

1—150 H.P. G. E. Induction Motor—3/60/220—875 r.p.m.—including starting equipment.

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FOR SALE

2—63" Dietz Toilet Converters.
1—81" Dietz Toilet Converter.

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FOR SALE

New and guaranteed used steel pipe, boiler tubing, valves, fittings, wood and steel tanks, steel buildings

JOS. GREENSPON'S SON PIPE CORP.
NATIONAL STOCK YARDS, Illinois.
S-4

CLASSIFIED ADS BRING RESULTS

FOR SALE

JORDAN PLUGS

1—Miami #6 bandless plug, motor drive, plain bearings, with 3/8" stainless steel filling.
3—Miami #6, plain bearing, belt drive, slotted 7/8" wide for 3/8" duplex.
1—Miami #6, plain bearing, motor drive, 5/8" slots for solid 5/8" bar, or two 1/4" or two 3/16".
2—Miami #2 anti-friction bearings, motor drive, slotted 7/8" wide for 3/8", 1/4", or 3/16" duplex.
1—Miami #2 plain bearing, motor drive, slotted 1/2" single or 3/16" duplex.
1—Miami #2 Bahr Bros. plug, plain bearing, motor drive.
1—Miami #1, anti-friction, motor drive, 3/16" single filling.
1—Miami #1, plain bearing, motor drive, slotted for 1/2" solid bar or 3/16" duplex.
2—Jones Majestic, motor drive, plain bearing, slotted 5/16" single.
1—Jones Imperial, plain bearing, belt drive, 3/16" bronze filling.
2—Noble & Wood Monarch plugs, Bahr Brothers type, plain bearing, belt drive.

STUFF PUMPS

1—7 x 16 Beloit duplex.
1—8 x 18 Shartle single.
1—10 x 20 Shartle triplex.
1—8 x 10 Worthington triplex.
1—12 x 12 Gould triplex.

SUCTION COUCH

1—25 x 138" Millspaugh suction couch.

CYLINDER MOLDS

4—36" x 72½" cylinder molds.
2—36" x 94" cylinder molds.
1—36" x 126" cylinder mold.
2—36" x 136½" cylinder molds.

EXTRACTOR ROLLS

1—24 x 120" Downingtown Extractor roll.
1—24 x 136" Downingtown Extractor roll.

PRESS ROLLS

1—22" x 136" rubber covered press roll.
1—22" x 133" rubber covered press roll.
1—22" x 132" rubber covered press roll.
1—22" x 136" brass covered press roll.

SHEETER

1—68" Kidder spot sheeter.
1—60" Moore & White sheeter.

BEATERS

2—Midwest High Speed Iron Tub Beaters, rolls 61 x 60.

PULPERS

1—#2 Lannoye Pulper.

JORDANS

2—Black-Clawson #2 Jordans.
1—Noble & Wood Monarch Jordan.
1—Noble & Wood Mammoth Jr. Jordan.

PASTER

1—114" Silicate Paster.

VATS

4—pair Downingtown Iron Vat Ends for 36" Molds.

CENTRIFUGAL PUMP

1—Allis Chalmers closed impeller, 1000 GPM, 150' Head.
1—Turbine driven centrifugal pump, Murray turbine, Frederick 8" DSV pump 2500 GPM, 95' head.

WINDER

1—4-drum Moore & White winder, 116" wide. Handle 60" diameter rolls.
1—104" Model 18 Cameron.

DRYERS

40 dryers 48 x 46.
19 dryers 36 x 95.
10 dryers 48 x 96.
17 dryers 48 x 160.
30 dryers 42 x 74.

TABLE ROLLS

30 table rolls 4 x 145.
28 table rolls 4 x 122.
200 table rolls various sizes.

VACUUM PUMPS

2—#4 Nash all bronze.
1—#3 Nash all bronze.
1—#6 Nash cast iron.
1—#4 Nash cast iron.

One fourdrinier machine, wire 110" x 60'. Suction couch 22". Two main presses, 29 dryers 48 x 109", one calender stack.

One fourdrinier machine, wire 91" x 64'-11"; with spiral bevel gear drives. Table rolls mounted on top of rail. 22" suction couch. First press Beloit suction, rubber covered; second press conventional, reversed. One smooth press; 26 dryers 48 x 88"; one 9-roll calender; one two-spool reel; one two-drum winder.

One good pulp drying machine 144" wide, extra heavy, complete.

Three Beloit Aldrich type shakes.

SHARTLE BROTHERS MACHINE CO.

Middletown, Ohio. J-12

THE FOLLOWING MATERIAL NOW SETTING UP IN MILL

CALENDERS

124" nine roll, box frame, Lobdell. Bottom roll 24" dia. two 16" dia. int. 11½-12" dia. Warren doctors. Beloit hypoid drive, new 1936.

104" ten roll, box frame, Farrel. Bottom roll 20" dia. one 10"; seven 10" and top 14". Warren doctors. Beloit hypoid drive, put in 1936.

104" eleven roll, box frame, Pusey & Jones, Bottom roll 18" dia. int. and top 9½-10" dia. Four rolls bored for steam. Warren doctors. Mortise gear drive.

REELS: Two—104", also one 115". Pusey & Jones offset with removable drums about 18" dia. slip belt disc for each drum. Drums about 33" on centers.

SLITTERS & WINDERS: Two 104" Warren two drum with low type slitter, 1 R.H. and 1 L.H.

SCREENS: Two 8 plate open side Packer with 12 x 43 screen plates.

PUMPS:
2—18 x 12 Goulds triplex stuff.
1—10 x 20 Shartle triplex stuff.
1—12 x 20 Shartle triplex stuff.
1—12 x 16 Shartle triplex stuff.
1—7 x 16 Shartle duplex stuff.

PUMPS:
1—Warren water pump, type 12 DL24, capacity 4800 GPM 80 ft. head, 690 RPM, new 1940.
1—Frederick 5" cent. stock, type TS, 50 ft. head, capacity 600 gallons, 1165 RPM.
1—Midwest Eng. Co. 6" suction and 6" discharge, new.

BEATERS:
2—Horne patent iron tub.
1—Holyoke broke.

SHAFTS & CORES: 11—72 x 6½ cutter shafts and 28 143 x 2¾-3½ O.D. coreshaft, also 11—151 x 2¾-3½ O.D. core shaft.

HOISTS: Four 5 ton Ingersoll Rand Air Hoists with trolley and I beams new 1927.

STITCHER: 1—Bliss Box Assembling Machine Model H.

PACKAGE: 1—Better Packages Inc. counterboy turntable table with compressor and motor with sealing tape holder.

TARGET MACHINE: 1—Broke target machine, tank about 8 ft. dia. x 18 ft., capacity two tons, ten years old, with two stage 6" Warren pump, type 250 D19, 100 HP, 200 ft. head, 1170 RPM.

FRANK H. DAVIS COMPANY, 175 Richdale Ave., Cambridge 40, Mass. J-19

FOR SALE

FOR SALE

Heavy press part with 24 x 136" Downingtown extractor roll, one rubber covered press roll 22 x 136"; one rubber covered press roll 21-7/16 x 132½"; one brass covered press roll 22 x 133. Two pair main press housings and bottom frame. Sixteen copper covered felt rolls 139" face; also two cylinder molds 36 x 136"; and four pair of vat ends.

SHARTLE BROTHERS MACHINE CO.
Middletown, Ohio J-19

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FOR SALE—1 Hamilton-Corliss Variable Speed Twin Engine, size of cylinders 12" x 24". Also Triple-Deck Frames for ninety 36" dryers, any width. The Chesapeake Paperboard Co., Baltimore, 30, Md. TF

FOR SALE—Brownell Twin Steam Engine, 12" bore, 14" stroke, Maximum steam pressure 175 pounds. Belt wheel 66" diameter, 19" wide. In excellent condition. Ready for immediate shipment. Address Box 45-303 care Paper Trade Journal. J1-12

FOR SALE

FOR SALE—Black-Clawson #2 Jordan. Reconditioned with Ryertex bearings, ¼" steel fillings practically new. Two bearing construction, without main base. Address Box 45-388 care Paper Trade Journal. J-26

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FOR SALE—6—Oliver BRAND NEW 8' x 6' Top Feed Rotary Filters or Dewaterers; Valley Iron Works 100 lb. Beater; Robinson 30" Refiner with 2—40 HP AC motors; Krupp Beater Mill or Pulp Disintegrator, with 40 HP AC motor. BRILL EQUIPMENT COMPANY, 225 West 34th Street, New York 1, N. Y. J-12

WANTED

WANTED

S.O.S. Bag Machines. Please write full information as to age, make, condition, range, speed and price.

Address Box 45-400 care Paper Trade Journal. J-19

WANTED—Two driers 48 to 56" wide, any diameter above 48". Cast iron pulleys same size range. Address Box 45-403 care Paper Trade Journal. J-5

WANTED—2 Hamblet Sheeters, 40" to 48". Urgent. Private party. Address Box 45-406 care Paper Trade Journal. J-19

WANTED—Brightwood Box Machine. Address Box 44-836 care Paper Trade Journal. tf

WANTED

WANTED

4 to 6 cylinder machine with trim from 60" to 86".

Address Box No. 45-373 care Paper Trade Journal J-19

WANTED — DISCARDED PAPER MILL FELTS. HIGHEST PRICES paid for all kinds of discarded paper mill felts. LARGE or SMALL QUANTITIES accepted. Prices quoted immediately on receipt of samples. ADDRESS: GLASER AND YOFFE, INC., 80 NORTH MAIN ST., NATICK, MASS. TF

WANTED—W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic Presses, Sheridan Presses, Dryers. Address Box 44-835 care Paper Trade Journal. tf

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by JACK ROSS PAPER MACHINERY CO.

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BELOIT FOURDRINIER MACHINE

Wire 91" by 65'—22" Suction Couch table rolls, ball bearing equipped—26 Driers two decked 48" face 88" dia. Nine roll calender, reel, winder machine equipped with Beloit enclosed spiral bevel gear drive, Voith Screens, pumps, etc.

1—Improved Paper Machinery Company 3 roll Hydraulic Wet Machine. Cylinder Mold 36" diameter 84" face. Complete with enclosed drive. Prints and photos on request. Used 1 year.
2—Pusey & Jones Horizontal Digesters. Welded equipment with Logan Circulators. 24' high and 7' diameter. 125# working pressure. Prints on request.
1—Guyton-Cumfer Saturator. Tank 50" wide. 5 gates complete. Prints on request.
1—Moore & White Flat Screen. 16 plates 12" x 24" .015 cut.
1—Moore & White Flat Screen. 20 plates 12" x 24" .015 cut.
1—Packer Flat Screen. 10 plates 12" x 42" .015 cut.
1—2" to 6" Oster Pipe Threading Machine. Direct connected to motor 440-3-60.
4—Driers—112" face x 48" diameter complete with 2 deck frames, gears, etc.
1—A. D. Wood Saveall—cylinder—60" face by 48" diameter—ball bearing equipped—rebuilt—specifications on request.
1—No. 1 Voith Pulper—capacity 20 tons per day—requires 20 h.p.
1—42" Liner and combining machine. Fourteen 6" diameter steam heated rolls and one drier 24" diameter.
3—Improved Paper Machy. Corp. #2 Knotters Bronze fitted. Good condition. Prints on request.
2—14" x 20" Connersville Vacuum Pumps. These pumps are fully rebuilt.
3—12" x 18" Connersville Vacuum Pumps. These pumps are fully rebuilt.
1—Downingtown 2500 lb. Iron Tub Cyclone Beater. Beater rolls 60" face, 72" diameter. This beater is in excellent condition, having been in operation less than 2 years. Prints on request.
2—Holyoke Platers—2 roll, 36" face x 18" diameter—complete with drive.
1—Nichols-Herreshoff Lime Kiln—vertical 65 tons capacity. Prints on request.
1—72" two drum Pusey & Jones Slitter & Winder will rewind 40" diam. rolls.
1—100" two drum Warren Slitter & Winder.
1—100" Two Bowl Reel—Bowls 20" diam.
1—E. D. Jones Standard Jordan with fast coupling and extended base for direct connection to motor.
1—Williams #30 type G. A. Bark Hog with 125 h.p. Synchronous motor. Ball bearing equipped and new spare parts—used one year.
1—Sumner Disc Barker—72" diam. disc. Anti-friction bearings. Direct connected 30 h.p. motor. Used 5 months.
1—140" two drum Warren Slitter & Winder.
40 Driers—96" face x 28" diameter complete with 2 deck frames, gears and bearings.
1—Sturtevant Bale Pulper with conveyor complete with 150 h.p. motor and starter.
8—10" x 20" Shartle Brothers Triplex Stock Pumps.
1—12" x 20" Shartle Brothers Triplex Stock Pumps.
1—8" x 18" Shartle Brothers Triplex Stock Pumps.
1—8" x 10" Worthington Triplex Stock Pumps.
3—12" x 12" Goulds Triplex Stock Pumps.
1—72" Seybold Automatic Knife with motor. (Like new.)
All above pumps in excellent condition.
2—1000 lb. Horne Iron Tub Beaters. Link Belt Chain Drive.
1—1200 lb. Holyoke Wood Tub Beater.
1—100" Proctor & Schwartz festoon drier—complete.
1—Trimbey Pulp Screen perforations. 090—30 tons capacity.
18 Driers—36" diameter—82" face—2 deck frames, gears and bearings.
6 Driers—36" diameter—82" face.
4 Sets of Press Rolls 15" diameter—87" face.
1 Set of Size Press Rolls—84" face—16" diameter.
1—750 lb. Downingtown Iron Tub Beater. Beater roll 36" face, 52" diameter. Iron Midfeather. Iron hood. Excellent condition. Used three years.
1—30 h.p. Allis Chalmers Motor. 600 RPM 2300 Volts. 3 phase. 60 cycle.
1—40 h.p. Fairbanks Morse Motor. 3600 RPM. 3 phase. 60 cycle.
1—Pulp Drying Machine 60 driers 48" dia. by 144" face. Heavy construction. Complete.
2—Beloit Fourdrinier Shakes.
1—Lobdell 124" 9 roll Calender stack with Warren Doctors. Beloit Hypoid Drive.
1—Farrell 104" 10 roll Calender Stack with Warren Doctor. Beloit Hypoid Drive.
1—Pusey & Jones 104" 11 roll Calender Stack with Warren Doctors Master Gear Drive.
2—Pusey & Jones 104" face and 115" face Removable drum reels.
1—Warren 2 drum low type slitter and winder. Will rewind rolls 40" dia.
1—Warren 116"—2 drum low type slitter and winder. Will rewind rolls 40" dia.
1—Warren water pump 4800 gals. p. m. 80' head 690 r.p.m. Used 1 year.
1—Frederick 5" Centrifugal stock pump 600 g. p. m. 50' head. 1165 r.p.m.
1—Midwest Centrifugal Stock Pump 6". New.
40—Driers 36" diameter 86" face. 3 deck frames, gears, bearings, etc. Battery of 4 Waterville Grinders, plates and heads in excellent condition.
100" Hamblet duplex plates with Reeves drive and assorting table.
1—Warren Brake Target with 2 stage Warren pump size 6-200' head 1170 r.p.m.
1—Sandy Hill Packer Flat Screen 8 blades with scraping device. New type roller cams. Used two years.
2—Sandy Hill Flat Screens 8 blades with scraping device.
1—Bliss Box Assembling Machine. Used 6 months.
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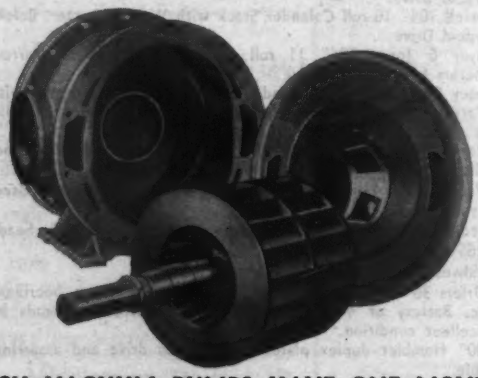

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CASEIN
Packing Products Co.

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Shenango-Penn Mold Co.
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Aktivin Corporation
Amer. Cyanamid & Chem. Corp.
American Resinous Chemicals Corp.
Ansul Chemical Co.
Calco Chemical Co.
Diamond Alkali o.
Dispersion Process Inc.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Geigy Co., Inc.
Gottesman & Co.
Hooker Electrochemical Company
The Mathieson Alkali Works, Inc.
Monsanto Chemical Company
The Neville Company
National Oil Products Co.
Naugatuck Chemical Div. of U. S. Rubber Co.
Niagara Alkali Company
Paper Makers Chemical Department, Hercules Powder Co.
Pennsylvania Salt Mfg. Co.
Pioneer Salt Company
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Stauffer Chemical Company
United States Rubber Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

CLEANING MATERIALS
Amer. Cyanamid & Chem. Corp.
Bird Machine Co.
E. I. du Pont de Nemours & Co., Inc.
Oakite Products, Inc.
Paper Makers Chemical Department, Hercules Powder Co.
Magnus Chemical Co.
Nichols Engrg. & Research Corp.
Pennsylvania Salt Mfg. Co.
Philadelphia Quartz Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Wyandotte Chemicals Corp.
J. B. Ford Division

CLUTCHES
Appleton Machine Co.
Black-Clawson Company
Hudson Sharp Machine Company
Farrel-Birmingham Co.
Fawick Airflex Co., Inc.
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Stearns Magnetic Mfg. Co.
Valley Iron Works Co.
T. B. Wood's Sons Company

COATING MACHINERY
Hudson Sharp Machine Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G.

COMPRESSORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Ingersoll-Rand Co.
Nash Engineering Co.
Worthington Pump & Machinery Corp.

CONSTRUCTION ENGINEERS
Merritt-Chapman & Scott Corp.

CONSULTING ENGINEERS
W. H. L. D. Betz
Frederic C. Clark
Ferguson, Hardy S.
Hardy, George F.
Johnson & Wierk, Inc.
The Kohler System Company
Main, Inc., Chas. T.
J. E. Sirrine & Co.
Stone & Webster Engrg. Corp.

CONTROLS
The Bristol Company

CONVEYORS
Black-Clawson Company
Murray, D. J. Mfg. Co.
Ross Engineering Corp., J. O.

CORES
Elixman Paper Co.
Senoco Products Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Smith & Winchester Mfg. Co.
Walker-Goulard-Plehn Co.

COUPLINGS
Black-Clawson Company
De Laval Steam Turbine Co.
Farrel-Birmingham Co., Inc.
The Frederick Iron & Steel
E. D. Jones & Sons Co.
Lovejoy Flexible Coupling Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John
Westinghouse Electric Corporation
T. B. Wood's Sons Company

CUTTERS
Thomas W. Hall Co.
Noble & Wood Mach. Co.
Perkins & Son, Inc., B. F.
The Smith & Winchester Mfg. Co.
Taylor Stiles & Co.

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DE-INKING
Kinsley Chemical Co.

DIGESTERS
The Biggs Boiler Works Co.
H. K. Porter Company Inc.
Pusey & Jones Corp.

DOCTORS
Bird Machine Company
Black-Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Black-Clawson Company
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Shartle Brothers
United States Rubber Co.
Westinghouse Electric Corporation

DRIERS
Black-Clawson Company
Murray Mfg. Co., D. J.
J. J. Ross Company
Ross, J. O. Engineering Corp.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Davis, Frank H., Co.
De Laval Steam Turbine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Company
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Moore & White Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
T. B. Wood's Sons Co.
Valley Iron Works Co
Westinghouse Electric Corporation

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co
Fibre Making Processes, Inc.
E. D. Jones & Son Co.
Moore & White Co.
Noble & Wood Machine Co.
Norwood Engrg. Co.
D. J. Murray Mfg. Co.

DYESTUFFS
Calco Chemical Co.
Ciba Company
E. I. du Pont de Nemours & Co.
Geigy Co., The
General Dyestuff Corp.
National Aniline Division, Allied Chemical & Dye Corp.
Paper Makers Chemical Department, Hercules Powder Co.
C. K. Williams & Co.
Witco Chemical Co

EQUIPMENT INSTALLATION
Merritt-Chapman & Scott Corp.

EVAPORATORS
Black-Clawson Company
Combustion Engineering Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Traylor Engineering & Mfg. Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS
Builders-Providence, Inc.
Merrick Scale Mfg. Co.
Leeds & Northrup
Traylor Engineering Co.
Wallace & Tiernan

FELTS
Appleton Woolen Mills
Astea-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co. Inc.
Draper Bros. Corp.
Fitchburg Duck Mills
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benningheven
Waterbury Felt Co.
Woodward, Baldwin & Co.

FELT GUIDES
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Colloid Co.
Amer. Cyanamid & Chem. Corp.
American Resinous Chemicals Corp.
International Pulp Co.
W. H. Loomis Talc Corp.
Union Talc Co.
Vanderbilt Co., R. T.
Witco Chemical Co.

FILTERS
Moore & White Co.
J. O. Ross Engrg. Corp.
Worthington Pump & Mchy. Corp.
Witco Chemical Co.

FLOORING, GRATING & TREADS
Hendrick Mfg. Co.
Norton Co
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
United States Rubber Co.

FORMING MACHINES
Downingtown Mfg. Co.
Noble & Wood Machine Co.
Oliver United Filters
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

WHERE TO BUY

GEARS
Black-Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

GRINDERS
Cavel-Hanchett Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Simonds Worden White Co.
United States Rubber Co.

HEATING, VENTILATING AND AIR CONDITIONING
The Appleton Machine Co.
Armstrong Machine Works
Fibre Making Processes, Inc.
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Ross Engineering Corp., J. O.
Shartle Brothers Machine Co.
Valley Iron Works Co.
Worthington Pump & Mchy Corp.

HOISTS
Appleton Machine Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones & Sons Co.

HOSE (Air, Water, Suction, etc.)
The Cincinnati Rubber Mfg. Co.
The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan Inc.
United States Rubber Co.

INSTRUMENTS, TESTING AND MEASURING
W. H. & L. D. Betz
N. P. Bosshart
The Bristol Company
Builders-Providence, Inc.
The Foxboro Company
General Electric
W. & L. E. Gurley
Leeds & Northrup Company
National Technical Laboratories
B. F. Perkins & Son
Taber Instrument Corp.
Taylor Instrument Cos.
Wallace & Tiernan Co., Inc.

JORDAN FILLINGS
Appleton Machine Co.
Behr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black-Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
Simonds Worden White Co.
Valley Iron Works Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
W. H. & L. D. Betz
Dilts Machine Works
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Taber Instrument Co.
Taylor Instrument Companies
Valley Iron Works Co.

LAY BOYS
Hamblet Machine Co.
Moore & White Co.
Shartle Brothers

LUBRICANTS
Gulf Oil Corporation
Gulf Refining Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Inc.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.

LUBRICATORS
Hills-McCanna Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Montague Machine Co.
Lobdell Car Wheel Co.
Walker-Goulard-Plahn Co.

MIXERS
Youngstown Welding & Engrg. Co.

MOISTENING EQUIPMENT
The Spray Engineering Co.

MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Co.
Ingersoll-Rand Co.
Reliance Electric & Engrg. Co.
Westinghouse Electric Corporation

PACKING BOXES
Johnson Corporation
Shartle Brothers Machine Co.

PACKING
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.

PAPER MACHINES
Black-Clawson Company
Downingtown Mfg. Co.
Thomas W. Hall Co.
Moore & White Co.
Pusey & Jones
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester

PAPER MACHINE SLICES
Black-Clawson Company
E. D. Jones & Sons Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPERMILL BUILDERS
Merritt Chapman & Scott Corp.

PAPER TUBE MACHINERY
Dietz Machine Works
Thomas W. Hall Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.

PASTING MACHINES
Black-Clawson Company
Davis, Frank H., Co.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John

PERFORATED METAL
Allis-Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

PIPE
Black-Clawson Company
Crane Company
Grinnell Company
Shartle Brothers Machine Co.
Taylor Forge & Pipe Works
Walworth Company
Youngstown Welding & Engrg. Co.

PLATERS
Perkins & Son, Inc., B. F.

PLATES
Black-Clawson Company
Hendrick Mfg. Co.
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Timken Roller Bearing Co.

PLUGS
Black-Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

PRESSES
Black-Clawson Company
Farrel-Birmingham Co.
Dietz Machine Wks.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
Rotogravure Engineering Co.
Shartle Brothers
Valley Iron Works Co.
Waldron Corp., John
Weber, Homer C.

PUG MILLS
Traylor Engineering & Mfg. Co.

PULPS
Andersen Co., J.
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Elof Hansson, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.

PUMPS
Allis-Chalmers Mfg. Co.
Black-Clawson Company
Dorr Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Frederick Iron and Steel Co.
Hills-McCanna Co.
Ingersoll-Rand Co.
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Paper Converting Mch. Co.
Quimby Pump Co. Div. of H. K. Porter Company, Inc.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Company
Worthington Pump & Machinery Corp.

RECOVERY SYSTEMS
Bulkley, Dunton Pulp Co., Inc.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones
Ross Engineering Corp. J. O.
Valley Iron Works Co.

RECTANGULAR BINS
Traylor Engineering & Mfg. Co.

REELS
Black-Clawson Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Company
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Rodney Hunt Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Behr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
The Hermann Manufacturing Co.
E. D. Jones & Sons Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout, Waldron & Co.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Bristol Company
The Brown Instrument Co.
The Foxboro Company
Jones, E. D., & Sons Co.
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Shartle Brothers
Taylor Instrument Companies
Wallace & Tiernan
Westinghouse Electric Corporation

RESINS
American Cyanamid & Chemical Corp.
American Resinous Chemicals Corp.
The Resinous Products & Chemical Co.

ROLLS
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Machy. Corp.
Lobdell Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
Reeblen Engraving Co.
J. J. Ross Company
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shuttuck-Penn Mold Co.
Sinclair Co.
Smith & Winchester Mfg. Co.
Stearns Magnetic Mfg. Co.
United States Rubber Co.
Valley Iron Works Co.
Waldron Corp., John

ROLL COVERS
The Cincinnati Rubber Mfg. Co.
Youngstown Welding & Engrg. Co.

ROLL STANDS
Cameron Machine Co.
Johnstone Eng. & Machine Co.
The Kohler System Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.

ROTARY KILNS
Traylor Engineering & Mfg. Co.

SATURATING MACHINES
Black-Clawson Company
Moore & White Co.
Noble & Wood Machine Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman C.

SCALES
Builders-Providence, Inc.
Merrick Scale Mfg. Co.

SCREEN PLATES
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Union Machine Co.
Union Screen Plate Co.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Harrington & King Perforating Co.
Hendrick Manufacturing Co.
E. D. Jones & Sons Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.

SCRUBBERS
Traylor Engineering & Mfg. Co.

SHEET MACHINES
Thomas W. Hall Co.
The Hermann Manufacturing Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
Valley Iron Works Co.

SHOWER PIPES
Bird Machine Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
Improved Paper Machy. Corp.
Moore & White Co.
Shartle Bros. Mach. Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.

SIZING
American Cyanamid & Chemical Co.
American Resinous Chemicals Corp.
Black-Clawson Company
The Dow Chemical Co.
du Pont, E. I., de Nemours & Co.
National Oil Products Co.
Paper Makers Chemical Department, Hercules Powder Co.
Pioneer Salt Company
Socony-Vacuum Co.
Philadelphia Quartz Co.

SLITTERS
Black-Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson Sharp Machine Company
Johnstone Eng. & Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SPRAY NOZZLES
The Spray Engineering Co.

STAINLESS STEEL
Allegheny Ludlum Steel Co.
Eastern Stainless Steel Corp.
Industrial Steels, Inc.

STARCH
American Cyanamid & Chemical Corp.
Clinton Co.
National Starch Products, Inc.
Stein, Hall & Co., Inc.

WHERE TO BUY

STEAM SPECIALTIES
Johnson Corp.
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

STRAPPING & STRAPPING MACHINES
The Stanley Works

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOXES
Black-Clawson Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Westinghouse Electric Corp.

SULPHUR
American Cyanamid & Chemical Corp.
Stauffer Chemical Company
Texas Gulf Sulphur Co.
Witco Chemical Company

SULPHUR BURNERS
Valley Iron Works Co.

TALC
American Cyanamid & Chemical Corp.
W. H. Loomis Talc Corp.
International Talc Company

TANKS
Frederick Mfg. Co.
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Manhatten Rubber Mfg. Division of Raybestos-Manhattan, Inc.
The Noble & Wood Machine Co.
H. K. Porter Company Inc.
Rodney Hunt
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
United States Rubber Co.
Waldron Corp., John
Youngstown Welding & Engrg. Co.

THICKENERS, DECKERS & SAVEALLS
Bird Machine Company
Bulkley, Dunton Pulp Co. Inc.
Carthage Machine Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
E. I. Du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.
Witco Chemical Company

TOOLS
Acme Steel Company
Ingersoll-Rand Co.
The Stanley Works
Walworth Company

TRUCKS
Elwell Parker Electric Co.
Wright-Hibbard Ind. Elec. Truck Co.

TRAPS
Armstrong Machine Works
Crane Co.
Grinnel Company
Johnson Corporation
Shartle Bros. Mch. Co.

TUBS
Rodney Hunt Machine Co.
Noble & Wood Machine Co.
Shartle Brothers
Valley Iron Works Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.
Westinghouse Electric Corp.
Worthington Pump & Machinery Corp.

USED EQUIPMENT
Frank H. Davis Company
Gibbs-Brower Co.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Shartle Brothers Machine Co.

VALVES
The Bristol Company
Crane Company
Dilts Machine Works
Fibre Making Processes, Inc.
The Foxboro Company
Hills-McCanna Co.
E. D. Jones & Sons Co.
Kennedy Valve Mfg. Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co
The Permutit Company
William Powell Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Taylor Instrument Companies
Valley Iron Works Co.
Walworth Company

VATS & VAT PARTS
Union Machine Co.
Union Screen Plate Co.

WASHERS
Bird Machine Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Radney Hunt Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

WATER CONDITIONING
The Permutit Company

WAXING MACHINERY
Black-Clawson Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WELDING EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Company
Walworth Company
Westinghouse Electric Corp.

WET MACHINES
Black-Clawson Co.
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
Montague Machine Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

WINDERS AND REWINDERS
Black-Clawson Company
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co.
Hudson-Sharp Mach. Co.
Langston Co., Samuel M.
Johnstone Eng. & Machine Co.
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Waldron Corp., John

WIRES
Appleton Wire Works
Black-Clawson Company
Bulkley, Dunton Pulp Co. Inc.
Cheney Bigelow Wire Works
Hayden Wire Works
International Wire Works
Lindsay Wire Weaving Co.
Shartle Brothers Machine Co.

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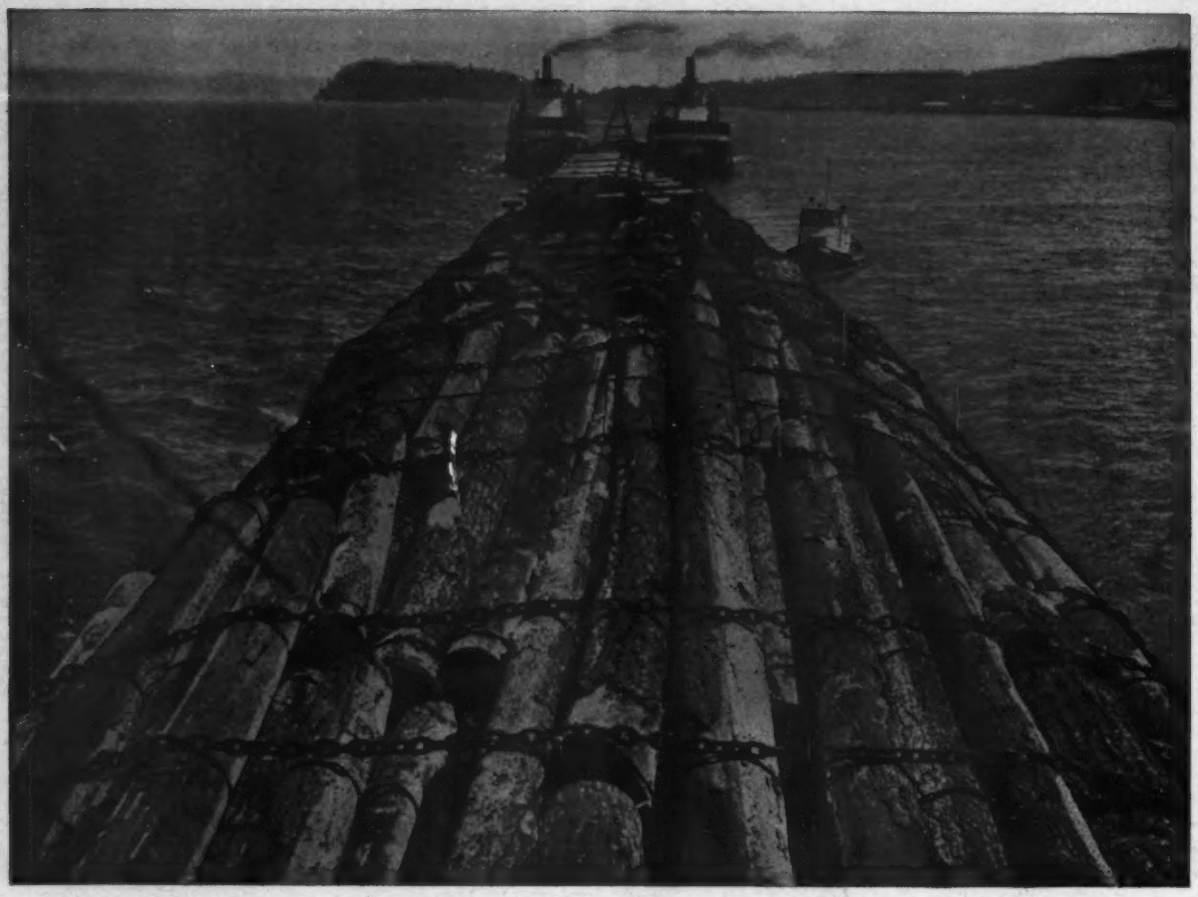

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